Coal Age

DECEMBER, 1952

A McGRAW-HILL PUBLICATION—PRICE 50c

Coal Stabilization?

Must the industry stabilize operations? How can it solve its thorny problems? p 66

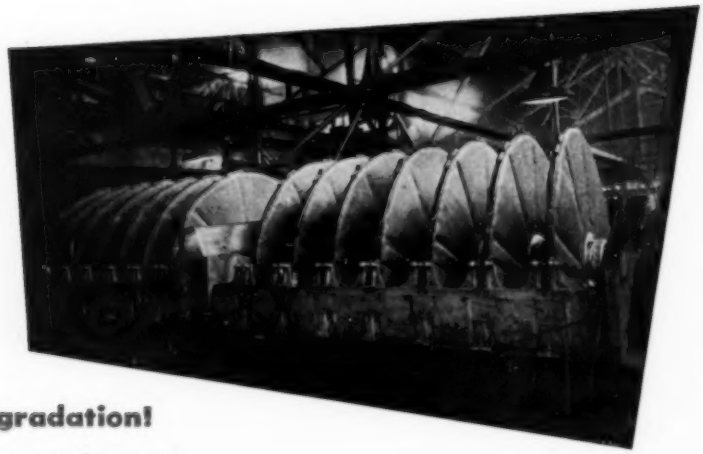
Low-Cost Two-Stage "Matte" Flotation

How P&R cleans breaker fines and slush deposits for profitable new markets. p 96

Full Contents on p 5

"Sunshine Mining"... p 72

DEWATERING FINE COAL



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Better grip, less slip — Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

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Grommet V-Belts BY

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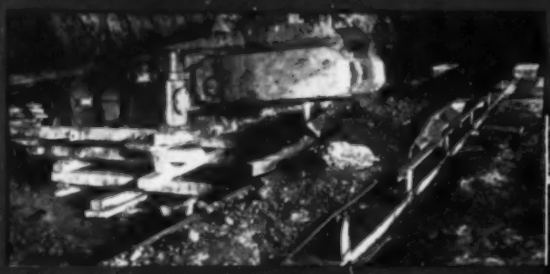

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1. Jeffrey 15-ton Locomotive installation in a large Pennsylvania mine.

2. A Jeffrey Face Conveyor discharging into a Room Conveyor which transports the coal to the entry.

3. A Jeffrey Room Conveyor discharging coal into an entry Belt Conveyor which transports it the entire length of the panel entry.

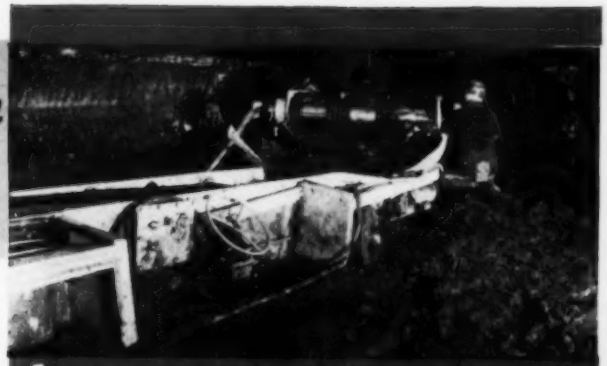
4. A Jeffrey 64-A Sectional Belt Conveyor being used for main haulage. Receives coal from several panel entry conveyors.

5. COLMOL Continuous Mining Machine discharging into MOLVEYOR.

6. Rear unit of MOLVEYOR discharging into an entry Belt Conveyor.

7. Loading Machine discharging into a Jeffrey Shuttle Car.

practical, low coal haulage



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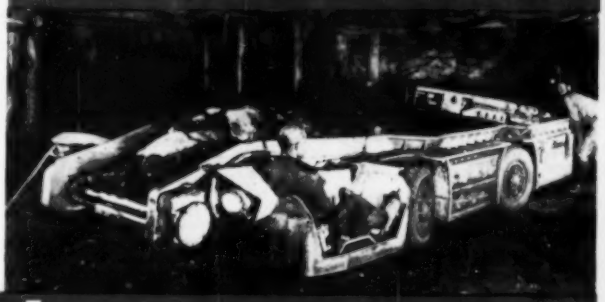

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● From the advent of the electric locomotive for transporting coal, JEFFREY has been an important factor in the development of low cost, modern methods of coal haulage. The accompanying illustrations portray these modern methods for continuous haulage from face to tipple.

Jeffrey conveyors in chain and belt types are in use in hundreds of mines and include face, room and entry in sizes and types best suited to your operation. Jeffrey is keeping abreast of the advances being made in mine mechanization. For example: the COLMOL for continuous mining, the MOLVEYOR for continuous transportation of coal from face to entry belt conveyor, and Shuttle Cars working between loader and entry haulage system.

All Jeffrey installations are engineered to meet the individual requirements of the mine. If you have a transportation job to do, it will pay you to consult a Jeffrey engineer on the method and equipment best suited both from the standpoint of investment and savings in cost of production.

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Coal Age

THIS MONTH'S COVER

"PUSHBUTTON MINING" remotely controlled from the surface without a man going underground—long the dream of many mining men—now has become a reality with the newly developed Carbide Miner (p 72). In this new "Sunshine Mining," one man sitting at a control panel guides the cutting head through the coal seam 690 ft from the outcrop, with potentialities of 1,000 ft or more in offing. How the machine is built, how it works and what it does is covered in great detail in this report, for we felt that every *Coal Age* reader would appreciate having every bit of information available on this unit. As a matter of fact, we'll wager you'll find it the most complete and authoritative description to be published.

COAL STABILIZATION . . .

This month's lead-off feature (p 66) pools the thinking and ideas of many men—coal operators, union, association and government officials, coal customers and members of our staff, as well as those directly quoted. To present a useful analysis of the problem, *Coal Age* reviewed past industry history, assessed current trends and talked to many men we knew had devoted real thought to the subject. As a follow-up on this informative report, we would be glad to publish comments or suggestions any operating man or executive would care to offer.

COMING IN COAL AGE

Practical cost-cutting methods that are effectively paring operating costs at a number of properties.

Triple-play mining by efficient combination of deep, strip and auger operation to produce 7,000 tpd.

How a new 2,500-tpd mine in Western Kentucky is planned for future growth.

Roof bolts in some of the worst roof in West Virginia hold where steel timbering failed.

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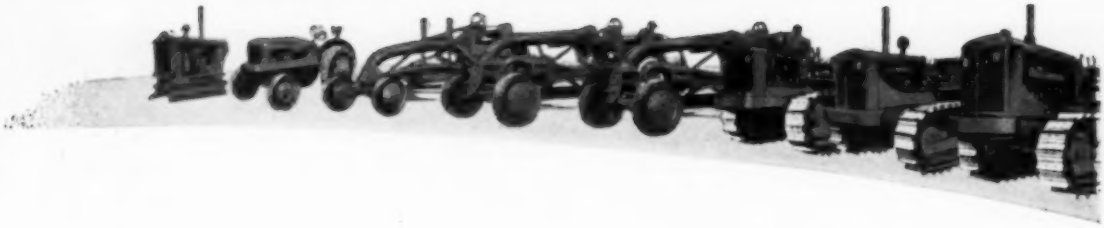

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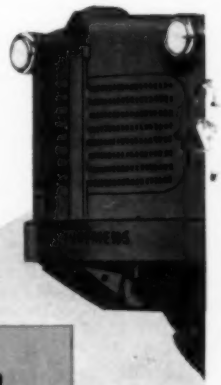

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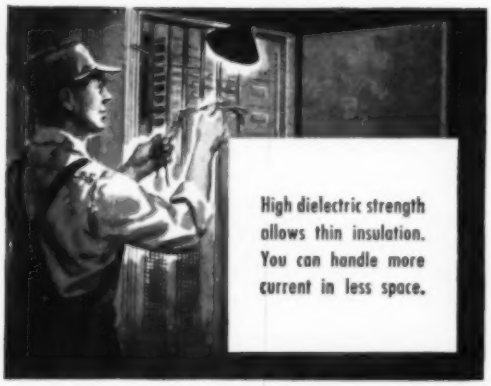

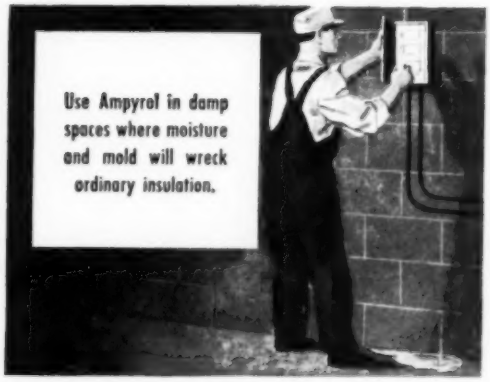

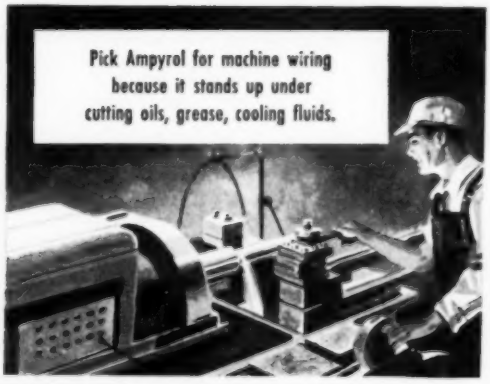

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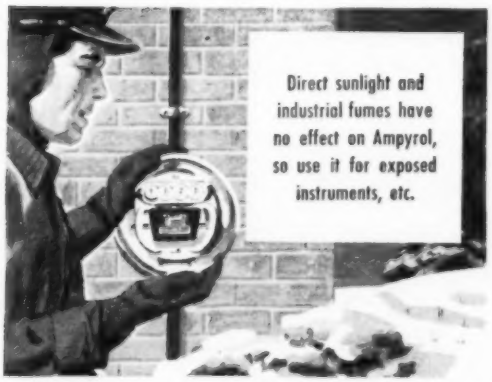
In addition, for ordinary low voltage applications, very thin walls of Ampyrol can be used. It's a natural for instrument or switchboard wiring when space is at a premium.

Be sure you get all the facts on Ampyrol before you choose an insulated wire. You may be able to replace *several* types of insulation with this all-purpose wire. Send the coupon for quick information.



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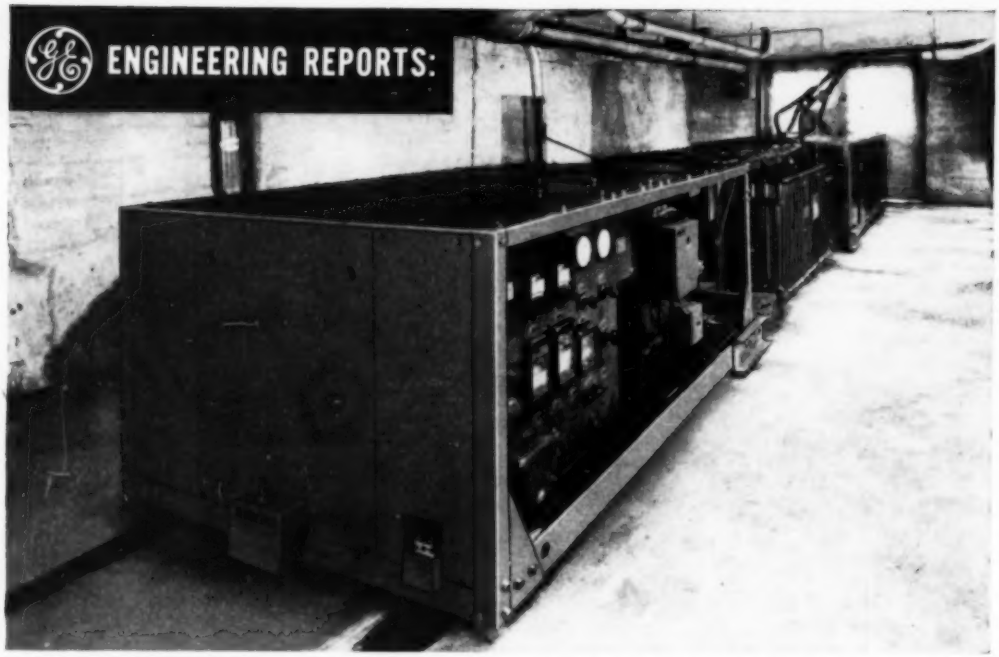
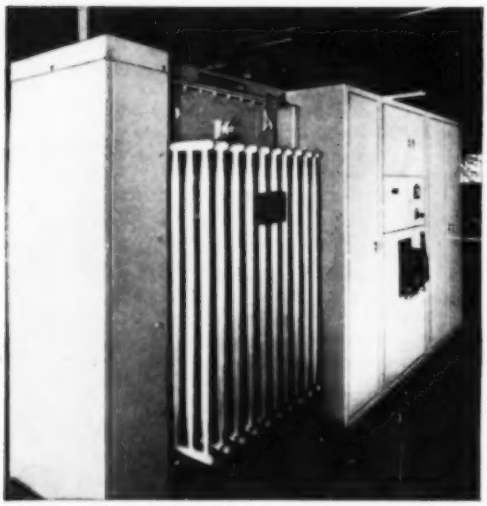
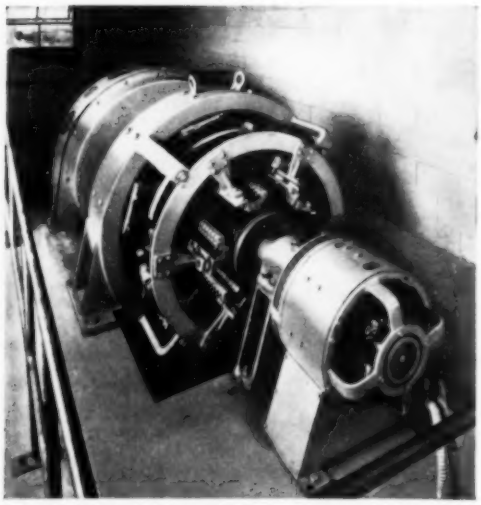


FULL VOLTAGE AT THE FACE is maintained at Crown Mine by this 300-kw G-E portable mining-type rectifier, to keep equipment working at high efficiency. The fully integrated, automatic unit is enclosed to better protect personnel.

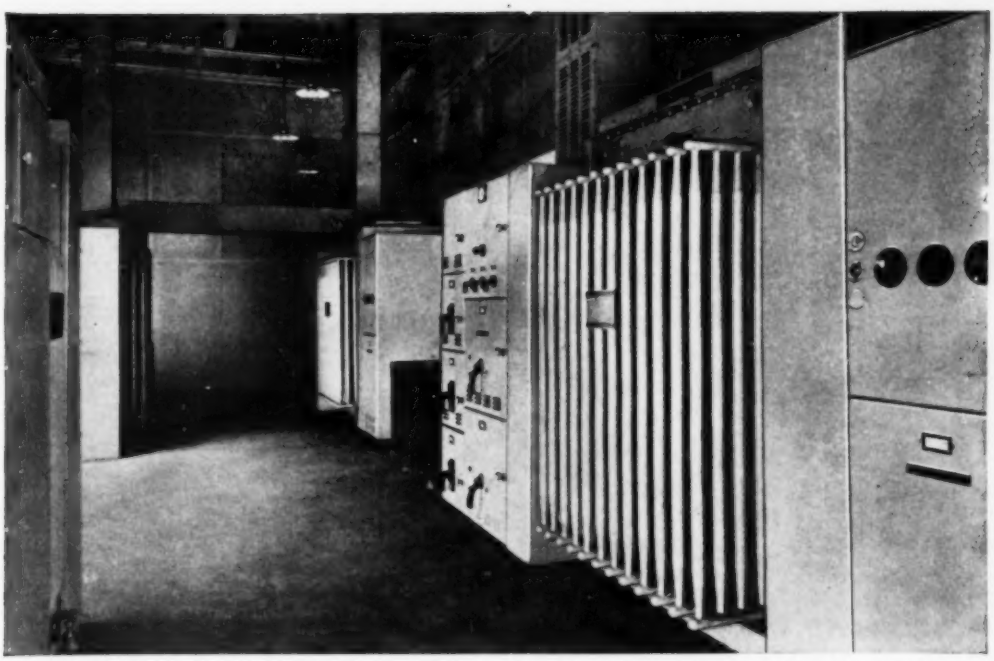
Engineered power system is key



STEP-DOWN TRANSFORMER and control, through which voltage is reduced to suitable levels for operating Crown Mine's auxiliary hoist, was engineered to meet mine's specific needs.



SYNCHRONOUS MOTOR-GENERATOR SET, rated 750 kw, supplies adjustable-voltage d-c power to motor driving the automatic main hoist. Set is controlled from plant's switchgear.



LESS VOLTAGE DROP takes place when plant voltage is stepped down close to points of use. These 4 G-E load-center unit substations at Crown Mine (2 at left, 2 at right), reduce voltage from 4160 to 480 to feed plant motors.

to Crown Mine's 800-tph output

HIGH-VOLTAGE POWER is distributed through this metal-clad switchgear lineup, where various mine and plant functions are sectionalized so that service interruptions are at a minimum.

Co-ordinated G-E equipment provides high service continuity, minimizes shutdowns

Modern is the word for Freeman Coal Mining Corporation's new Crown Mine at Farmersville, Illinois, with a rated capacity of 10,000 tons per day of coal. And modern is the word for its power distribution system, engineered and equipped by General Electric to assure high service continuity, integration of underground and surface operations, and consistently high output.

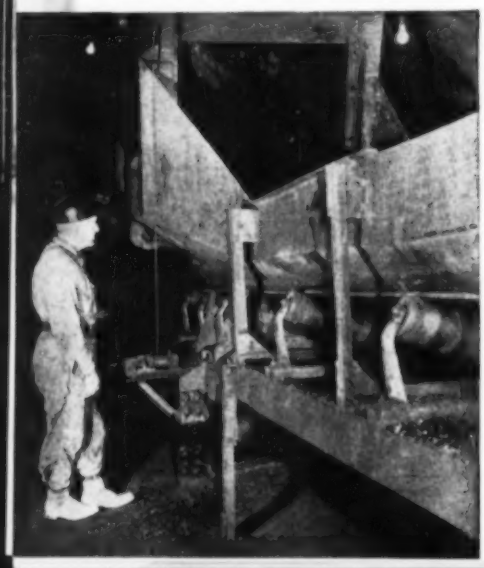
Just as G-E engineers utilized every applicable technique to co-ordinate Crown Mine's electric equipment into an efficient, low-cost system, they can do the same for your mine. To find out how, contact your local G-E Apparatus Sales Office—soon. General Electric Company, Schenectady 5, N. Y. 663-30

Engineered Electrical Systems for Coal Mines

GENERAL ELECTRIC

Perry Coal Co. reports **Belt reinforced with Du Pont "Cordura" eases change from shaft to slope mine**

View down slope of conveyor belt at St. Ellen Mine (above). This 42" belt conveys 450 tons of coal per hour, over a distance of 973 ft. along a 16° slope. Coal is delivered to a 3000-ton outside stockpile, eliminating a hoisting bottleneck. Below, hopper dumps coal onto belt. Cushion idlers are used to help ease shock of the 3-ft. drop.



When the St. Ellen Mine of the Perry Coal Company, of O'Fallon, Illinois, changed from a shaft mine to a slope mine over three years ago, their engineers recommended a 42" conveyor belt reinforced with Du Pont Cordura* High Tenacity Rayon. They report that the belt, manufactured by Hewitt-Robins, Incorporated, trains well, loaded or empty . . . stands up under exceptionally heavy service.

"Cordura" reinforced belts trough and train better because "Cordura" yarn adds *greater strength with less bulk*. Inherently stronger than yarns of natural fibers, "Cordura" permits thinner, more flexible belts, which sit firmly on the center idler. And the low stretch of "Cordura" saves expensive shutdowns for take-up and resplicing.

Why not find out more about the advantages of conveyor belts reinforced with Du Pont "Cordura"? We'll be glad to send you the names of suppliers. For more information about "Cordura," write for the free booklet "Sinews for Industry." E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Department, Room 4421-H-6, Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

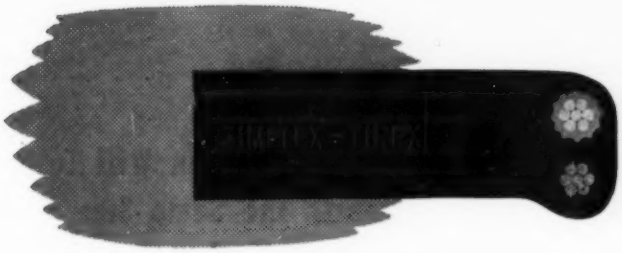
STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

REPEAT ORDERS CONFIRM POPULARITY OF

TIREX SHUTTLE CAR CABLE



Simplex-TIREX Shuttle Car Cable with the unusual "geared" design is barely more than two years old, yet it has already achieved widespread popularity.

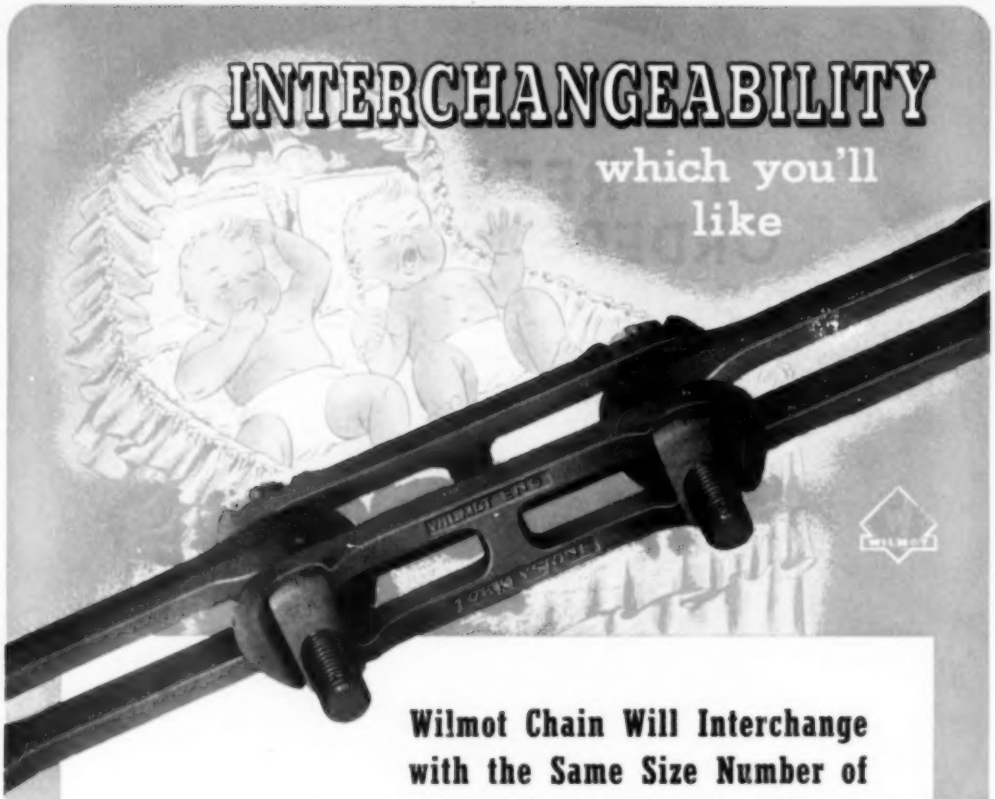
The reason for this unusual popularity is not dificult to find. It is told in repeat orders and in letters from enthusiastic customers. Repeat orders, of themselves, are the finest testimonial any product can receive.

The letters explain why customers are buying Simplex-TIREX Shuttle Car Cable to the exclusion of all other types for shuttle car and mining machine service. The reasons given are many and varied but they all add up to the same conclusion. TIREX Shuttle Car Cable gives longer life under more rugged conditions and will haul more tons of coal per dollar of cable cost. That's a darn good reason for anybody to buy a product.

Have you tried Simplex-TIREX Shuttle Car and Mining Machine Cable yet for your "buggies"? If you haven't, you can get it from your mine supply house.

Simplex - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 SIDNEY STREET,
CAMBRIDGE 39, MASS.



Wilmot Chain Will Interchange with the Same Size Number of *ANY* Other Rivetless Chain

As originators of rivetless chain, Wilmot not only offers the largest choice of sizes available, but furthermore Wilmot chain of any given size number will interchange with the same number of any other chain. This larger choice and complete interchangeability are shortening "down" time for hundreds of our customers. Chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs., of drop-forged steel, alloy or cast chrome-manganese. Use Wilmot chain for all replacements.

WILMOT REPRESENTATIVES

BIRMINGHAM 4, ALA. -- Amos. A. Culp, 930 Second Avenue, North

CHARLESTON 23, W. VA. -- Cross Pump & Equipment Co., P. O. Box 889

HAZLETON, PA. -- Wilmot Engineering Co., Markle Bank Building

HONOLULU 6, H. I. -- P. S. Pell & Co., Ltd., 88 S. Queen St.

KNOXVILLE, TENN. -- Crowell Engineering & Sales Co., 3045 Sutherland Ave.

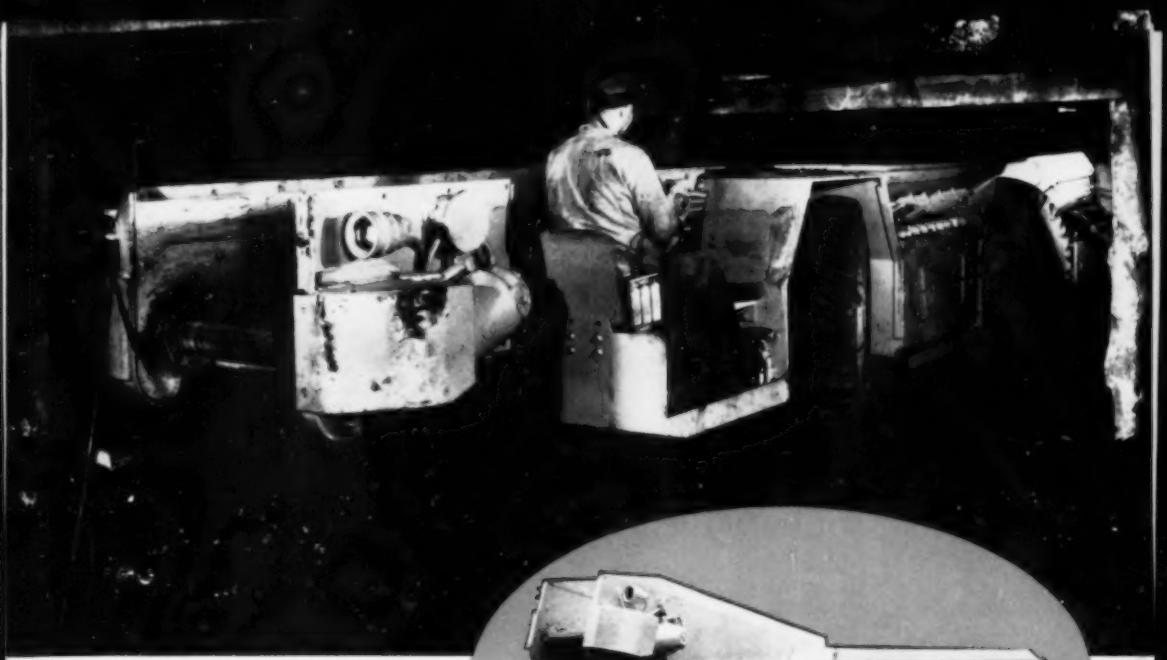
PITTSBURGH 16, PA. -- Harold C. Lusk, 3045 West Liberty Avenue

ST. LOUIS 5, MO. -- Jack Van Horn, 7543 Cromwell Drive

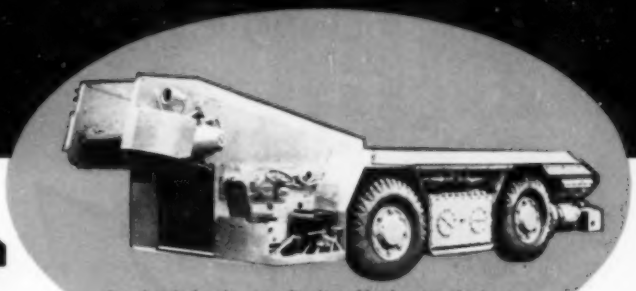
NEW YORK 38, N. Y. -- International Manufacturing & Equipment Co. (export only), 220 Broadway

Send for 248-page book on Chain, Conveyors and Elevators.....

WILMOT ENGINEERING CO. HAZLETON, PA. Plant: WHITE HAVEN, PA.



The 10-SC, here being loaded by a JOY Continuous Miner, has the capacity, power and speed needed for real high-production work.



Complete hydraulic control, adjustable elevating discharge, and four-wheel drive and steering mean greater maneuverability, more flexibility.

JOY

10-SC SHUTTLE CAR

A *RUGGED, HEAVY-DUTY* MACHINE-

field-proved for fast, dependable, low-cost transfer in high-production mining!

Write for Bulletin, or

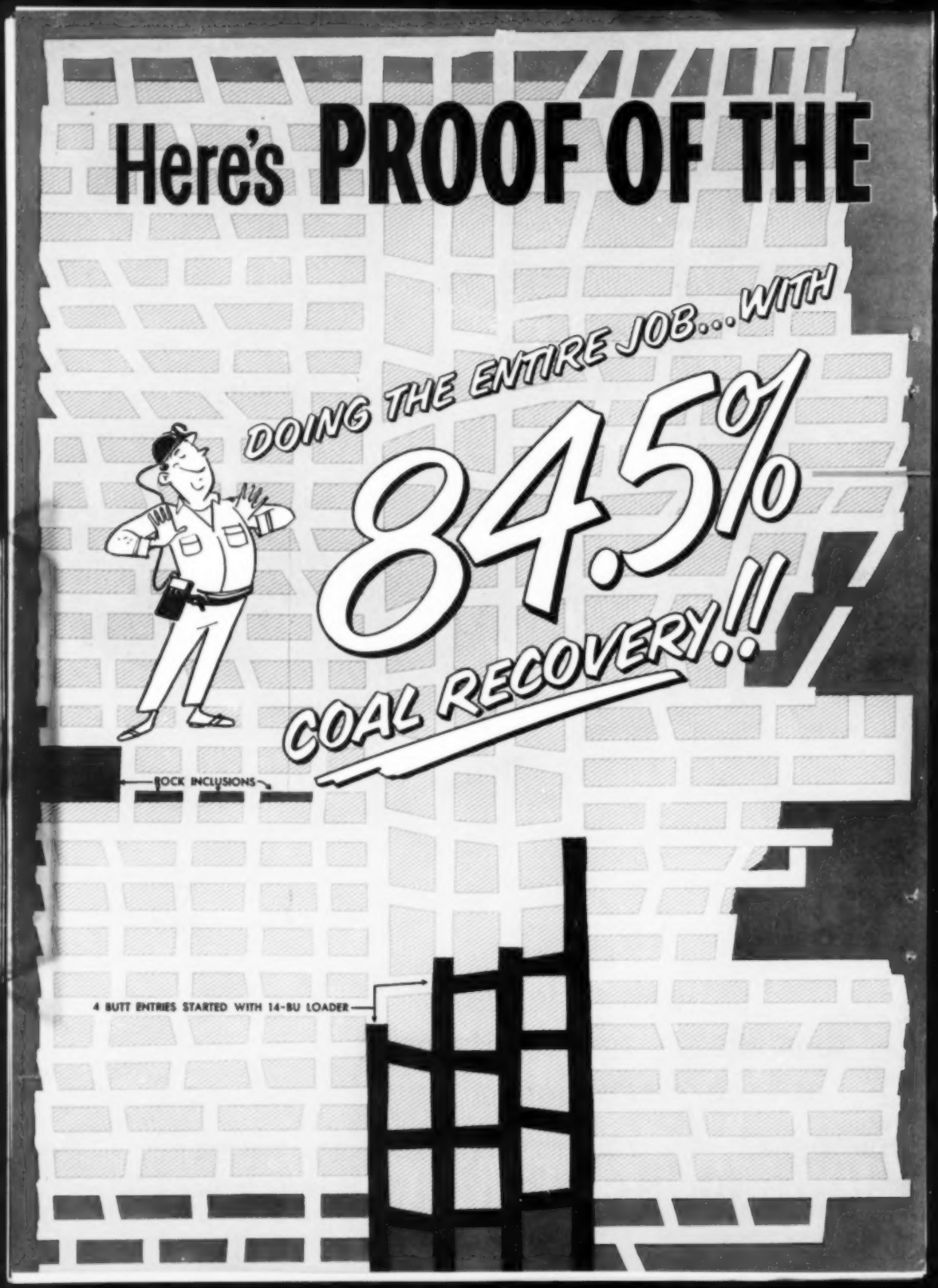
Consult a Joy Engineer

W&D CL 2920

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO


Here's PROOF OF THE
DOING THE ENTIRE JOB... WITH
84.5%
COAL RECOVERY!!
ROCK INCLUSIONS
4 BUTT ENTRIES STARTED WITH 14-BU LOADER

VERSATILITY of the JOY CONTINUOUS MINER

HERE ARE THE DETAILS:

Mine: Located in central Pennsylvania, operating in the Lower Kittanning seam.

Conditions: Considered generally fair in this section. Height of the coal was 40" to 46". There was no top boney. Part of the roof was sandstone, part slate. The floor was of hard fireclay nature, fairly level.

Machine Model: The Joy 3-JCM Continuous Miner.

How Used: Placed in a set of four butt entries previously started with a 14-BU Loader. The Miner completed driving the entries, mined the rooms to right and left of the entries and extracted all pillars, including the entry pillars.

Auxiliary Equipment: Two shuttle cars were used back of the Miner. They discharged the coal on a belt conveyor which, in turn, spilled the coal on another belt conveyor.

Crew: Four men—two on the Miner and two shuttle car operators. They also used a Face Boss and one mechanic on each machine shift. No man was needed at the belt head, since this belt spilled the coal directly on the main haulage belt.

Total Coal in Area: 124,916 tons

Total Coal Recovered: 105,507 tons

Recovery percentage: 84.5%

Time Span: 620 days (started Dec. 11, 1950 and finished August 22, 1952). The machine worked 771 shifts on a double shift basis.

Shift Tonnage: 136.84 tons/shift

Man Tonnage: 34.21 tons/face man, which of course included all delay time.

The versatile, powerful Joy Continuous Miner can operate in any mine it can enter. Thin seams, thick seams, split seams—all can be efficiently worked without shooting.

The mined-out section illustrated on the facing page is a typical performance. This case history is just one more of the many instances which amply prove that the Miner will do a quick, thorough job of developing entries and driving rooms, and in addition, a top-notch pillar-recovery job.

In fact, users will tell you that the Joy Continuous Miner actually is "the best machine developed to date for extracting pillars."

The 3-JCM can be furnished either 34" or 39½" high, and will mine from 6" below to 66" above bottom. The 4-JCM is available in 48" or 53¼" heights, and will mine from 5½" below to 98½" above bottom. Special equipment will permit the 3-JCM to mine to 76" above bottom, and the 4-JCM to 120" above bottom. A third model, the 2-WM, is available for mines operating in very low coal, handling seams as thin as 30".

Let us show you how the Continuous Miner will fit into your operation, to give you high-production mining at absolute rock-bottom cost per ton of coal mined. ● *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL-4414

JOY PLUGS

NO. D3A375RM Male

MINING'S CHOICE *for* PORTABLE POWER TRANSMISSION

Modern mining technique permits no pampering of men or equipment. From power source to working face, everything must keep pace with production schedules. That's why it's important to *you* that more JOY connectors are used in mining operations than all other brands combined.

This proves that JOY plugs, receptacles and distribution boxes "measure up" to the industry's high standards for performance, safety and durability.

JOY plugs are molded to cable as one-piece Neoprene units—shatter-proof, wear-resistant, and impervious to the deteriorating effects of moisture, grime or oil. Through them, power cable can be sectionalized into easily handled lengths for rapid replacement of damaged sections.

JOY plugs are supplied for A.C. or D.C. operation in current capacities as required. They are available in three or four-contact models, described below, and also with one or two conductors. ● Write for complete details and bulletin today!

NO. D3A375RF Female

Straight Pin Bigun (SPB) plugs illustrated at top and left are JOY's three-conductor style with pilot contact. Note reversed contact for polarization and grounding.

3-CONDUCTOR DESIGNS (*for D. C. Application*)

REVERSED PIN PLACEMENT: Male plug has one socket that engages contact pin in female plug for grounding and polarization. Supplied for #10 through 750 MCM wire sizes.

PILOT PIN DESIGN: As above except for two additional "pilot control" contacts that may be shunted or carried through cable on #10 wire. Supplied for #8 thru 500 MCM wire sizes.

4-CONDUCTOR DESIGNS (*for A. C. Application*)

REVERSED PIN PLACEMENT: Male plug has one socket that engages contact pin in female plug for grounding and polarization. Supplied for #10 through 500 MCM wire sizes.

PILOT PIN DESIGN: As above except for two additional "pilot control" contacts that may be shunted or carried through cable on #10 wire. Supplied for #10 through 400 MCM wire sizes.

IMPORTANT: Pilot pin designs are *permissible* when used with JOY Safety Circuit Center power distribution boxes. *Write for complete details.*

Consult a Joy Engineer

W&D ME 4131

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

A gravel pit owner reports . . .

J & L JALLOY

"HAD'EM SKUN A MILE"

At Left—Walter Stevens holds up J&L Jalloy cutting edge which lasted 2½ years before replacement. Only ⅛" thinner than when new.

Above—It takes tough steel to withstand digging material like this!

Above—Walter Stevens rams loader bucket into gravel bank to pick up another load of gravel.

MAINE STEEL INC. uses tough J&L JALLOY to decrease "Downtime" on Hydraulic Loader at H. H. Stevens Co.

We're pretty pleased with the way Mr. Walter Stevens of H. H. Stevens Sand & Gravel, Gorham, Me., feels about J&L Jalloy.

Mr. Stevens is using a "Straight-Line" hydraulic loader, built by Maine Steel Inc., to load trucks with the sand and gravel from his pit. It's tough work. The loader bucket is rammed into the gravel bank at high speed reverse, which means the severest kind of impact and abrasion on the equipment.

To decrease service interruptions to the work of its loaders, Maine Steel has used ½" x 6" Jalloy plate for the bucket's cutting edge.

Here's how Jalloy has worked out—

Mr. Stevens reports, the first cutting edge of Jalloy lasted 2½ years—loaded 40,000 cubic yards of sand and gravel.

Mr. Stevens sums it up this way. "*That blade saved me quite a bit of money.*"

And Maine Steel Inc. is pleased with J&L Jalloy too—

P. J. MacDonald, Maine Steel Welding Foreman, reports Jalloy is no trouble at all to weld using a regular coated rod.

Finally, Mr. G. C. Soule, President of Maine Steel, says that HE'LL CONTINUE TO SPECIFY J&L JALLOY FOR ALL CUTTING EDGES.

Why not write today for our booklet, "*For Longer Wear . . . Less Repair.*" It will give you complete information on Jalloy, plus examples of how other mining and quarrying men are using this modern mining steel to save them money. The coupon is for your convenience.

J&L STEEL

Jones & Laughlin Steel Corporation
411 Gateway Center
Pittsburgh 30, Pa.

Please send me a free copy of your booklet, "For Longer Wear . . . Less Repair."

Name_____

Company_____

Address_____

_____

JONES & LAUGHLIN STEEL CORPORATION PITTSBURGH 30, PA.

WESTINGHOUSE
Minestarter
PAIRED FOR PRODUCTION
Life-Line motor
DO NOT LUBRICATE

Dependability...

wrapped in explosion-proof construction

Here's an explosion-proof team that has the inherent dependability so important to today's mining operations. There's no time to pamper motors and controls. After installation, they have to stand on their own feet. These Life-Line motors and Minestarters have been establishing such a record for many years. They're built to meet Bureau of Mines standards.

Look at this Life-Line SK d-c motor.

Its pre-lubricated double-sealed bearings need no lubrication. The bearings are sealed, too—no chance for grit or dirt to enter and cause bearing wear. The heavy all-steel frame and feet add extra mechanical strength—stand up to the daily abuses encountered in many mine locations.

What about the Minestarter?

Its design provides continuous operation. Magnetic blowouts on the magnetic contactor quickly confine, divide and extinguish the arc—minimize burnout of contact tips. Contacts operate with a rolling action—confine arcing to the tips of the contacts. Thermal overload relay lags on short high-current peak during starting—acts instantaneously when overload can cause damage.

Talk it over with your Westinghouse representative. Ask him for a specific recommendation to meet your problem. Or, write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21650

YOU CAN BE SURE... IF IT'S

Westinghouse

MOTORS and CONTROLS

This machine thrives on tough jobs

The "Caterpillar" Diesel No. 212 Motor Grader is an important piece of equipment in the strip mine operated by Fyock & Reed, near Stoystown, Pa. Here it's shown cleaning the face of the coal after overburden has been removed. But the machine has many other jobs. It builds and maintains haul roads, levels around the shovel and clears snow in the winter.

Among the features that make the "Cat" No. 212 a favorite with mining men are these:

1. *Every inch of it is "Caterpillar"-designed and built.*
2. *Weight, horsepower and speed are balanced for top performance.*
3. *Mechanical controls assure instant, positive blade action under all conditions.*
4. *Tandem drive provides constant power delivery and traction.*
5. *The operator has a full view of road, blade and job.*
6. *Full range of blade positions gives complete accuracy and versatility.*

Like all "Caterpillar" equipment, the No. 212 is ruggedly built to stand up on the toughest jobs. Your "Caterpillar" Dealer will give you the full facts about this machine, and he'll back its long, profitable work life with genuine "Caterpillar" parts and reliable service.

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

This modern machine is next to infallible—yet even so, the Bethlehem operator checks the reduction of his wire.

His attention to detail means better rope for you

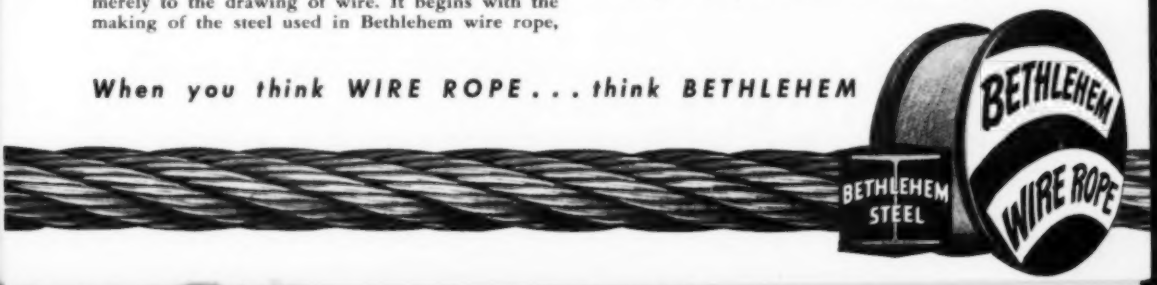
Wire-drawing is a fundamental step in the making of Bethlehem rope, and it's done on machines that almost never make mistakes. Nevertheless, this operator, like others in the Bethlehem mill, runs frequent checks on the work going through. He wants to be sure that his part of the job meets the specified standards—which are very, very high.

This care, this attention to detail, is not confined merely to the drawing of wire. It begins with the making of the steel used in Bethlehem wire rope, and it carries through each and every step to the final inspection and reeling.

Care is a lot of *little* things which, taken together, mean a quality product. It is one of the reasons why you cannot buy a better rope than Bethlehem makes.

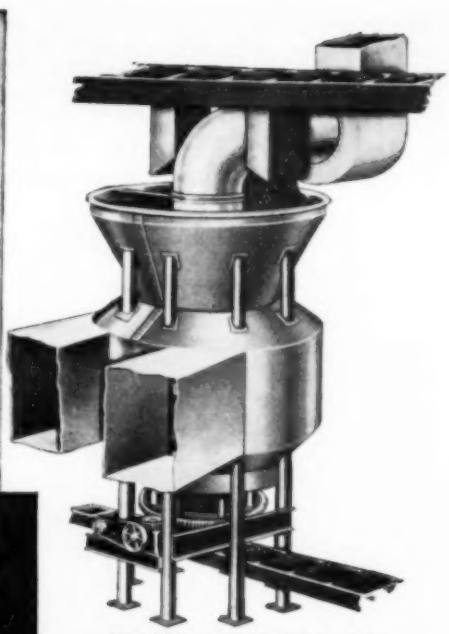
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM



We've Made Nothing But Coal Mining Equipment For The Past 80 Years

Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this background of creative engineering and long-standing reputation for sturdy construction that assured efficient, dependable performance at lower over-all costs. Call a Holmes Mine Equipment engineer for consultation in the planning and development of your requirements. There is no obligation.



BAUGHMAN "VERTI-VANE" THERMAL COAL DRYER for economical, uniform large-scale drying of all sizes, from 1¼" down. Reduces surface moisture to approx. 2%. Unit handles 15 to 75 tph. Ask for Catalog No. 101.

HOLMES

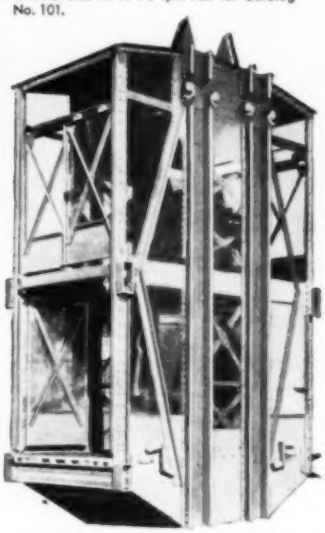
MINING EQUIPMENT

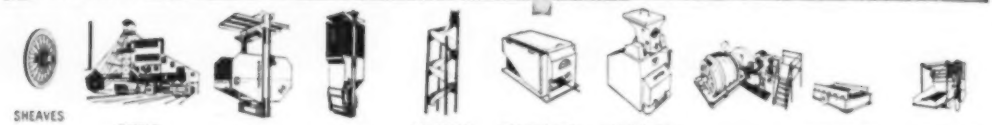
SINCE 1872

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

ADVANCE DESIGN HOISTS feature the latest and most complete control equipment. Ask for complete information.

HOLMES HEAVY-DUTY CAGES in all sizes and types for rapid hoisting and low maintenance. Ask for complete information.





SHEAVES · TIPPLE EQUIPMENT · CAGES · SKIPS · LOWERING SPIRALS · CAR PULLERS AND RETARDERS · LABORATORY CRUSHERS · HOISTS · VIBRATING SCREENS · DUSTOLATORS

MORE TIME for loaders to load—

with

GULF MINING MACHINE LUBRICANT

When you use Gulf Mining Machine Lubricant you can eliminate two or more other lubricants, depending on the type of cutting and loading equipment you operate. At the same time this quality lubricant provides better protection for bearings and gears in underground equipment. The result is more time on the job; less down time for repairs and lubricant application. For additional information on Gulf Mining Machine Lubricant, send the coupon below.

1. **Less down time—better protection**
2. **Less handling—fewer lubricants**
3. **Fewer applications—reduced leakage**

GULF SERVES INDUSTRY

Gulf Oil Corporation · Gulf Refining Company CA
719 Gulf Building, Pittsburgh 30, Pa.

Please send me without obligation, a copy of your pamphlet "Gulf Mining Machine Lubricant."

Name .....
Company .....
Title .....
Address .....

RECOVER COAL FINES WITH EIMCO AGIDISC

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal. These filters will:

1. Reduce moisture content in the fine coal to 15% or better, depending on the other plant equipment.

2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.

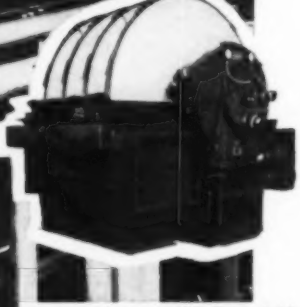
3. Permit uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.

4. Produces greater tonnage of dewatered coal per square foot of filter surface.

5. Save a product that has been considered too expensive to process—providing additional profits per ton of coal washed.

6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.



Above 8' diam. x 4 disc Eimco Agidisc filter—below in prominent washing plant. Battery of 8' diam. x 10 disc Eimco filter.

A410

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

EXECUTIVE OFFICES AND FACTORIES - SALT LAKE CITY 13, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

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EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
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IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
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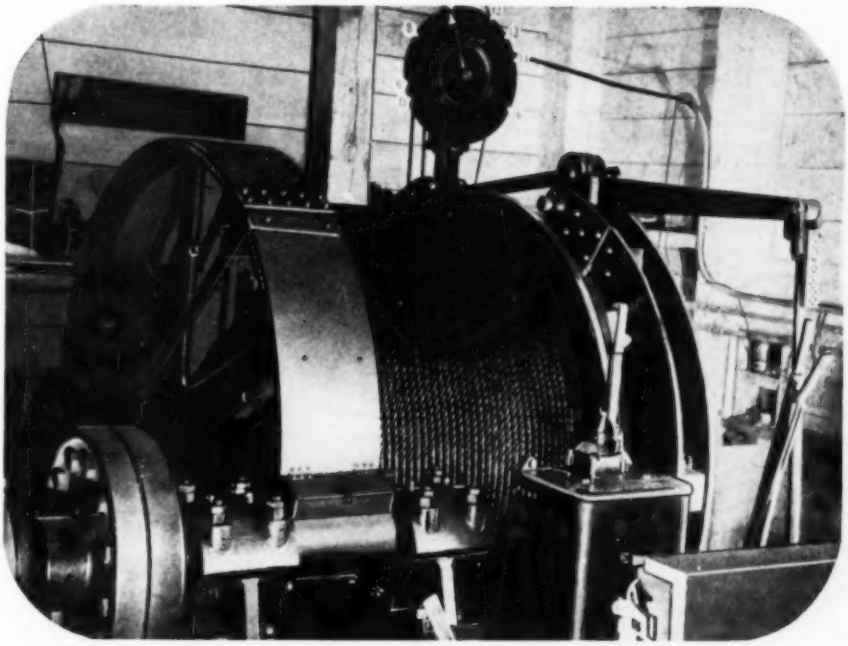
WIRE ROPE



This is the longest-lasting rope we've ever made for mining

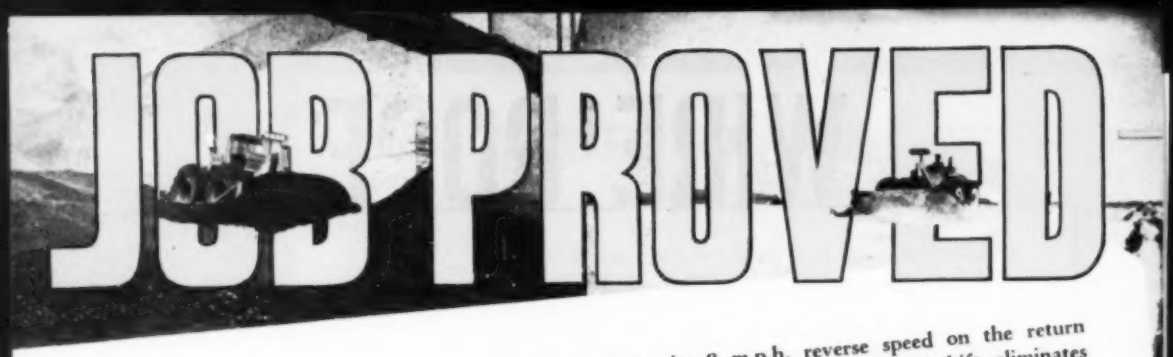
JUST MENTION wire rope and most everyone thinks of Roebling. For one thing, Roebling made the first wire rope in America. But what's more, we've always led in developing better wire rope for the needs of every branch of industry.

Roebling Preformed "Blue Center" Steel Wire Rope is today's best bet for mining service. It's safe, dependable and stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.



Always on the alert for new and better methods, progressive dirtmovers everywhere are modernizing their pushing, pulling and dozing tasks with LeTourneau high-speed Tournadozers. Rolling on big rubber tires instead of on steel tracks, Tournadozer provides speed and mobility never before available for your pit operations. Tournadozer goes anywhere under its own power — shovel to shovel, pit to dump, plant to stockpile. It travels fast over any terrain, on pit roads, along or across railroad tracks, or over paved highways. Because it can thus utilize waiting time for productive assignments, one Tournadozer can often replace 2 or more slow-going crawler dozers.

Twice as fast as crawlers

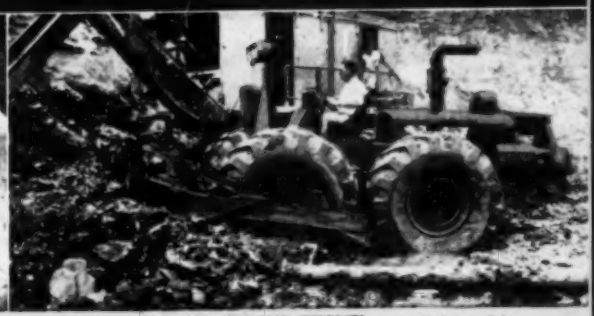
Wherever it goes Tournadozer "runs" at a fast 19 m.p.h. clip instead of "crawling" at 5 to 8 m.p.h. Then, too, your dirtmoving cycle is greatly speeded up by its 8 m.p.h. reverse speed on the return half of the cycle. Instantaneous shift eliminates slowdown or loss of momentum when shifting gears.

Big 21.00 x 25 low-pressure tires give you greater traction and increased flotation in sand, mud, snow or on ice. Tournadozer's 186 h.p. coupled to 4-wheel drive moves heavier loads on the level, up steep grades, or through soft footings.

Tournadozer has many other advanced mechanical features—including fingertip electric steering, shifting, and blade controls . . . constant-mesh transmission . . . multiple-disc air brakes . . . torque converter . . . and down-pressure blade.

No matter where you are located, it will pay you to get all the facts on how modern, rubber-tired Tournadozer can increase your production and reduce costs. For complete information, write or call your LeTourneau Distributor.

In Chile, STOCKPILES NITRATE—At Port of Iquique, Tournadozer speeds bulk storage and simplifies handling of huge quantities of nitrate while working inside and around the outside of two 88,000-ton capacity storage plants. Big-capacity blade easily moves more than 2½ yards of bulk nitrate on each trip from the conveyor, then rehandles it for delivery through hatchways to dock conveyor. High-speed reverse (8 m.p.h.), approximately twice that of most crawlers, is an important time saver on this shuttle-type operation.



In Malaya, CLEANS AROUND SHOVEL — At Malayan Collieries, in Selangor, Tournadozer works with shovel to remove 200 feet of shale overburden. Tournadozer handles all clean-up . . . has ample spare time to level dump areas, push-load scrapers. When used as pusher, it reduces scraper loading time 70 to 80%, increases loads 25% over self-loading. In spite of 21-hour-a-day, 7-day-a-week work schedule, Tournadozer maintenance has been very low. Note excellent condition of tires after a year's operation.

R. G. LeTOURNEAU, INC.

Peoria, Illinois

from Tropics to Arctic Circle

In Norway, MAINTAINS MINE HAUL ROADS— To uncover magnetite ore at Kirkenes, Norway, open pit mine, 215 mi. north of the Arctic Circle, Sydvaranger, A/S — well-known Oslo firm — assigned the removal of approximately 25,000,000 yds. of rock to 12 Tournarockers and 2 high-speed Tournadozers. Working year-around in temperatures as low as 31° below zero, Tournadozers build and maintain haul roads from mine to crushing plant, and handle clean-up around all shovels in the pit.

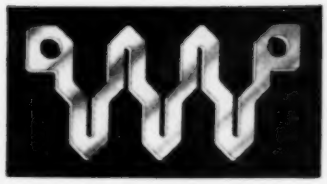
In Minnesota, HANDLES SCATTERED ODD-JOBS— Stanley Mining Company, Biwabik, Minnesota, operates its ore pit, crusher, and washing plant 24 hours a day, 7 days a week. Mining taconite which must be crushed, screened, and processed — the company found Tournadozer was its best tool for handling scattered dozing jobs. In addition to shovel clean-up, Tournadozer maintains rock dump, cleans spillage at crushing plant, and feeds hopper from surge pile. Rig does work normally handled by 2 to 3 crawlers.

In Venezuela, STOCKPILES SAND AND GRAVEL — Compania Anonima Cominos uses its Tournadozer for a variety of pushing, pulling and dozing tasks near Puerto La Cruz, Anzoategui. Besides pulling a Rooter and Flatbed trailer, push-loading Tournapulls, and backfilling pipe at the 740-acre refinery, Tournadozer stockpiles sand and gravel for the project's concrete plant. Rig's big blade and 4-wheel 186 h.p. push easily handles heavy materials . . . keeps mixer continuously supplied for uninterrupted operation of company's plant.

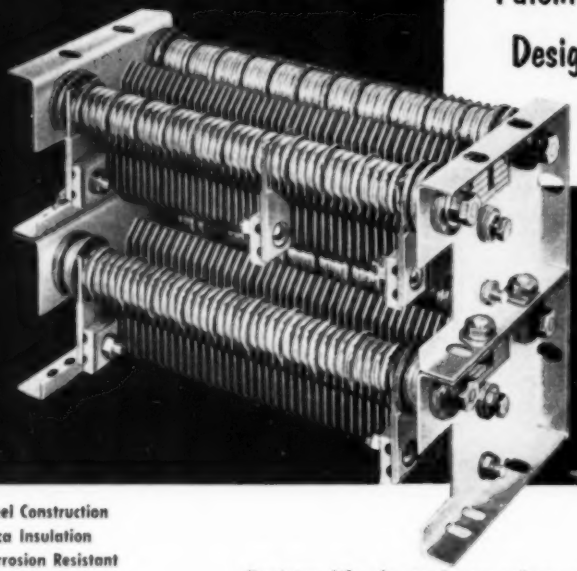
WHY CRAWL WHEN YOU CAN RUN?

LE TOURNEAU LET EQUIPMENT

Resistor life depends on adequate ventilation.....



Patented P-G Grid Design eliminates HOT SPOTS



Designed to fit your present resistor space

- Steel Construction
- Mica Insulation
- Corrosion Resistant
- Vibration Proof
- Moisture Resistant
- Provision for Expansion
- Adequate Ventilation
- Rugged Terminals

Steel Grid Resistors for COAL MINES Since 1915

Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.

P-G

The Nonbreakable Steel Grid Resistor

THE POST-GLOVER ELECTRIC COMPANY

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI 2, OHIO

The BOWDIL Company
CANTON, OHIO

Gentlemen:

☐ Have your representative see us.

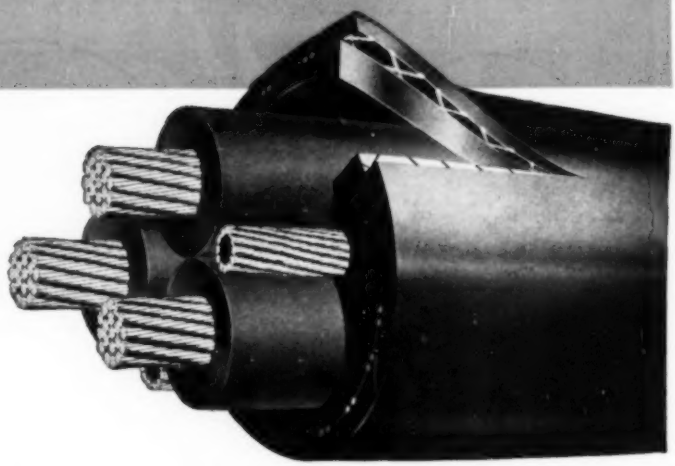
NAME .....

COMPANY .....

ADDRESS .....

CITY ..... STATE .....

Here's your mine cable insulated with COLD RUBBER



Another big improvement in Securityflex 600-V Mine Cable

*Cold rubber is firmer and tougher and less permeable. It gives this new and better Type G Securityflex**

much more moisture resistance
much more compression resistance
much more cut resistance

That means longer cable life, fewer power interruptions, less maintenance trouble, *much more value for your money.*

Also—the famous Anaconda patented rubber-cored grounding wires are non-kinking and cushioned in a larger diameter that won't cut insulation.

This means far more dependable and efficient grounding. When the cable twists in service the grounding wires are protected. Every wire in every strand is firmly supported and cushioned. There'll be fewer failures, fewer splices, less production loss, less expense.

Investigate this cable. See it. Call your nearest Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

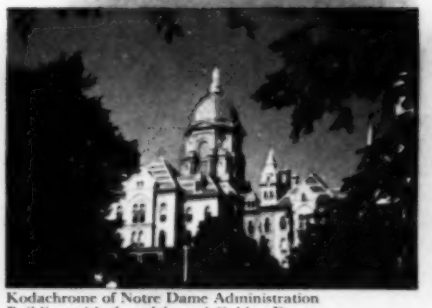
*Trademark

the right cable for the job ANACONDA® WIRE AND CABLE

DESIGNED FOR STRIP MINING
MANITOWOC
4500
REACH....
More and more of the leading strip operators and contractors are switching to the big, powerful Manitowoc 4500. It's the real sensation of the mining industry . . . sensational in design and performance. As a shovel, it ranges from 4 yds. on a 60′ boom, 5 yds. on a 50′ boom, 5½ yds. on a 40′ boom. As a dragline, it ranges up to a 140′ boom. And there's power-a-plenty in its rugged 375 H.P. Diesel.
STABILITY...POWER
It's packed with extra features . . . fewer gears, all enclosed running in oil; high speed shafts on ball or roller bearings; simple, independent cable crowd; single, tubular stick rolls through saddle but is free to turn. Ships on standard flat cars with minimum dismantling. Unload and erect in 3 to 5 days.
MANITOWOC
SHOVELS
1-5 YD.
MANITOWOC
Speedcrane
CRANES
18-100 TON
WISCONSIN

Markets for WASHED COAL wherever you go..

South Bend for instance!



Kodachrome of Notre Dame Administration Building with the celebrated Golden Dome.

The great city of South Bend is proud of many things . . . the world-wide scholastic renown of the University of Notre Dame, the home of the traditional Fighting Irish football team . . . its over 100 years' contribution to the carriage trade of transportation . . . its 80-year-old newspaper, celebrated for its noted writers and famous features . . . its nationally known laundry equipment which has taken the drudgery out of home laundering . . . its sister city of Mishawaka, noted in its own right as the location of the first iron smelter west of the Alleghenies and now with a sky line dotted with stacks rising from huge industrial power plants and foundries.

Industrialists in the area are keenly conscious of the value of cleanliness. As a result they have erected disposal plants to clean up the water of the St. Joseph River. Many of these men are just as conscious of the desirability of burning clean coal and its consequent money-saving advantages.

Profit-minded executives insist upon washed coal . . . coal that will produce the highest Btu for their coal dollar. Coal, for example, that comes from a modern coal preparation plant that up-grades raw coal to premium grades by production-line automatic methods of crushing, washing, sizing, and drying to meet exacting specifications.

The Studebaker power plant, illustrated here, is a typical example of a user of washed coal. Operators of other power plants and home-owners alike have proved that washed coal for industrial or home heating use is their best buy . . . low in cost, easy to store, in constant supply.

Whether it comes from the states of Indiana, Illinois, Ohio, West Virginia, Pennsylvania, or any other coal producing state, much of the coal shipped in to South Bend and Mishawaka is bound to be washed in McNally Pittsburg modern coal washery plants such as illustrated.

Coal producers are invited to consult with us on up-grading their coal to sell in the large tonnage stable markets.

Reproduction of advertisement substantially as it appeared in Fortune Magazine.

Illustration of the Steam Generating Power Plant of The Studebaker Corporation, South Bend, Ind.

Typical, modern, efficient coal preparation plant shipping washed coal into the South Bend area.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—*Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

You, too, can UP-GRADE your coal *to sell in blue chip markets!*

Customers are becoming more critical about the coal they buy . . . many of them buy according to their own specifications. If such buyers are haunting you, and your sales department in turn is prodding your production department to produce that kind of coal, then you will want to investigate. If you want to find out how you can hold such buyers, and reach out for more of them, here's help for you. Read . . . then send for these bulletins.

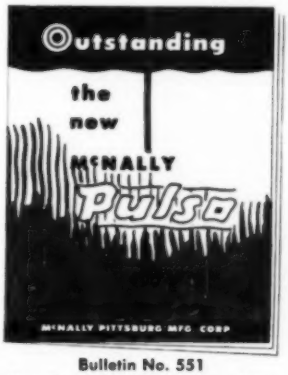
1st Talk personally with our technical staff

These experts have discussed this problem with operators in every bituminous field in Continental United States and some foreign countries. They can make laboratory tests of your raw coal to determine just of what beneficiation it is capable when automatically crushed, screened, washed, dried, and blended. Consultation is without cost or obligation.

2nd Study these "How to do it" Bulletins

Bulletin No. 451

This bulletin explains what is required to up-grade coal to premium class; how to produce marketable coal from run-of-mine; how to process a saleable product from low-grade seams.



Bulletin No. 551

Describes and illustrates the very latest equipment and layout for drying fine coal. No dust . . . no degradation . . . no air pollution.

Bulletin No. 450

Complete information on how you can insert a flexible cleaning circuit in your present plant in minimum time . . . at minimum cost. It offers a "packaged coal cleaning plant" for smaller mines.

Bulletin No. 151

Tells how to convert those grades, for which there is a slow market, into premium stoker and steam sizes. America's most complete line of coal breaking and crushing equipment.

Bulletin No. 501

Describes and illustrates the units of equipment that go into a completely modernized preparation plant. You will need this bulletin to help you order replacements.

and . . . You can do this without cost or obligation

Find out . . . mail the coupon

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation — *Manufacturing Plants:* Pittsburg, Kansas Wellston, Ohio • Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro Pittsburg, Kansas • Wellston, Ohio

Pin this coupon to your letterhead

☐ Send your engineers for consultation

Mail the Bulletin Marked

☐ No. 551 ☐ No. 450 ☐ No. 501

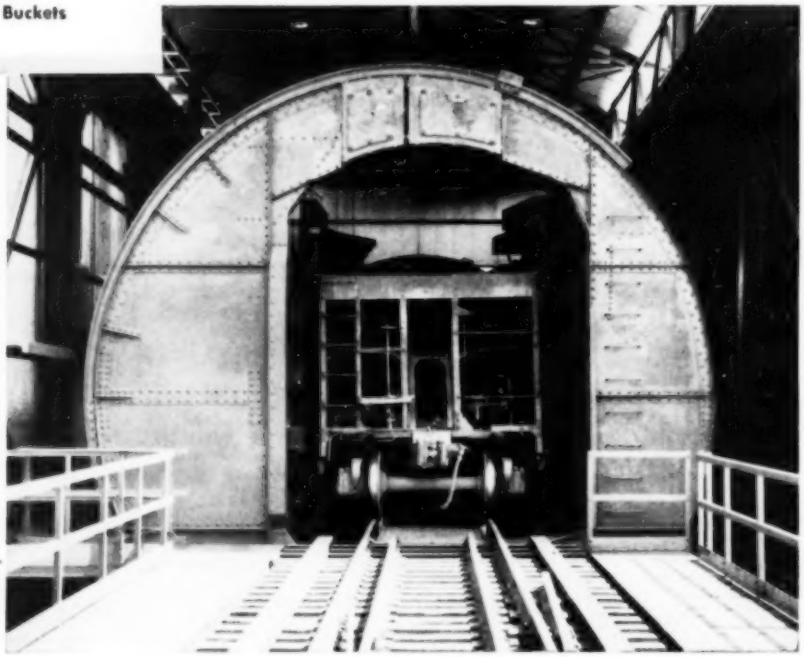
☐ No. 451 ☐ No. 151

Wellman will build it

Special Cranes
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

→ **Wellman car dumpers**

...designed and built for years of dependable service



Wellman 60-ft., 4-clamp Revolving Car Dumper. A rack segment and pinion at each end of the frame turns each end equally, preventing distortion of the frame.

● The complete line of Wellman Car Dumpers includes Lifting, Turnover, Traveling and Revolving Types, the latter is shown above. It is self-contained, requiring no external structures. You can depend on Wellman equipment for many years of economical performance. It is backed by more than half a century of experience in engineering, manufacturing and construction.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

with a CARDOX - HARDSOCG

Surface AUGERMINER

No New Development Work

See how this AugerMiner drills into the exposed seam—brings out coal in mechanized flow for simple mechanical loading.

CARDOX-HARDSOCG Surface AugerMiners are restoring many a "dead" strip mine to new and profitable life. They're drilling up to 50 tons of coal per man-shift from seams where overburden had forced abandonment of mining by conventional methods.

Maybe you have such a property. If you have, find out how an AugerMiner can turn the coal you left behind you into low cost tonnage.

IT'S *BONUS* RECOVERY

Through earlier stripping you have already paid to expose the coal seam. Now use it as a new source of income, produced at a cost usually much less than for the original working. You'll get clean, high grade coal because vertical directional control keeps the auger drilling into the best part of the seam, avoiding rock and shale. Sizing is controlled, to some extent, by the type cutterhead used.

SIMPLE—PRACTICAL—FAST

The AugerMiner is trucked or towed on its detachable wheels to the face of the seam. Its self-contained elevator posts position it at the height of the seam. Then augers up to 40 inches in diameter drill back into the seam to a distance of 100 feet or more. Augers are extended in 6-foot lengths by means of the AugerMiner's hoist and removed as easily with the built-in retriever. AugerMiners are available with 95 or 145 HP engines for all conditions and thicknesses of seam.

Ask your nearest CARDOX Representative—or write for new AugerMiner Bulletin now.

HARDSOCG DIVISION
CARDOX CORPORATION BELL BUILDING • CHICAGO 1, ILLINOIS

Boston, Illinois • Camden-on-Gauley, W. Va. • Evansville, Indiana • Harpur, W. Va.
Illinois Fuel • Louisville, Colorado • Pikeville, Kentucky • St. Clairsville, Ohio

ON TARGET!

ACME

MINE COMPRESSOR

Track gauges adjustable from 42" to 48". Height 30", length 136", rail clearance 3", wheel base 48", width 66½".

AVAILABLE IN 4 NEW MODELS

130 CFM
168 CFM
210 CFM
275 CFM

Loadless starting

Full forced-feed lubrication

Low oil pressure shut down—high temperature shut down

Air cleaners featuring both oil bath and air scrubbers

Immediate delivery. Available on any type mounting.

ACME MACHINERY CO.

BOX 1169—WILLIAMSON, W. VA.—PHONE 1834

cut tonnage costs

with P&H ELECTRIC SHOVELS

In more and more locations these ultra-modern P&H machines are taking over the jobs that call for big production — steady digging. Users who know their cost accounting come back for more — for one proved reason . . . *lower tonnage costs.*

Contributing factors are these:

P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically, gives you snappier dipper action — eliminates hoist generator, slip friction clutch and other troublesome mechanical devices.

P&H stepless power regulation is smooth and accurate — with no control fingers or contactors to give you trouble.

Independent propel, all-welded construction, filtered air cab and other modern refinements have led the way to more dependable production on a year-in, year-out basis.

If you seek lower tonnage costs in open pit work, let us tell you where you can see a P&H Electric Shovel in action. Ask about a P&H today.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch

Every third P&H Electric Shovel sold is a repeat order

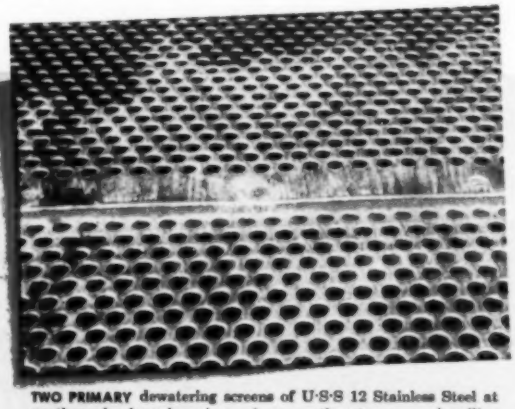
HARNISCHFEGER CORPORATION

4400 West National Avenue • Milwaukee 14 Wisconsin

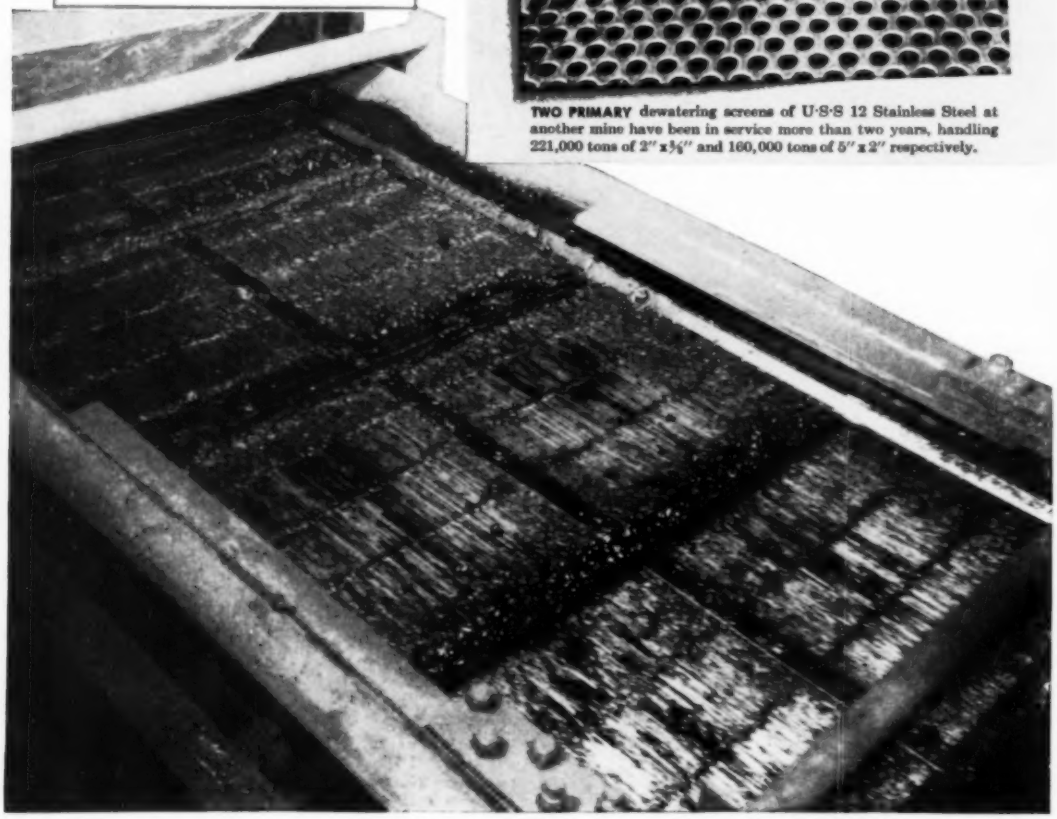
POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

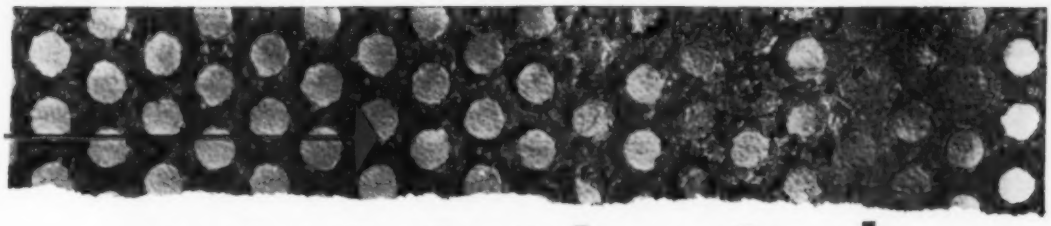
Put an end to "blinding" by replacing your old screens

SINGLE-DECK secondary dewatering and desanding screen at the Mosscreek Plant of Pennsylvania Coal & Coke Corp., Cresson, Pa., has handled 300,000 tons of ⅛" x ¼" coal, and the six wedge slot type stainless steel screens that cover the deck are still in very good condition.



TWO PRIMARY dewatering screens of U·S·S 12 Stainless Steel at another mine have been in service more than two years, handling 221,000 tons of 2" x ⅜" and 160,000 tons of 5" x 2" respectively.





with U·S·S Stainless Steel

YOU KNOW WHAT HAPPENS on desanding and dewatering screens when corrosion goes to work. Rust and coal particles build up around the small perforations, the holes finally fill up, and screening efficiency drops off.

You can prevent this blinding by replacing your present screens with those made of U·S·S Stainless Steel. Because Stainless Steel resists the corrosive effects of acidulous mine waters used in processing and cleaning, the perforations remain clean and smooth and open for business.

This means important savings to you, both from the standpoint of more production and lower maintenance and replacement costs. Screens of U·S·S Stainless Steel have stayed in service for two to three years in locations where screens made of other materials lasted only two to three months.

Combined with this freedom from corrosion, screens made of U·S·S Stainless Steel have high resistance to abrasion. That means less wear on the surface of the screen, and, even more important, less difficulty from oversize holes.

Desanding and dewatering screens represent only one application in the plant where Stainless Steel can make preparation more efficient and less costly. It performs equally well on scalping and sizing screens, as well as on chutes, flumes and other spots where corrosion and abrasion cause difficulty.

You can step up efficiency and reduce costs *now* by beginning a program of replacing your old screens with U·S·S Stainless Steel. Stainless Steel suitable for these applications is available now. Ask your screen supplier.

STAINLESS STEEL wire on the bottom deck of this refuse dewatering screen has handled more than 100,000 tons of refuse.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

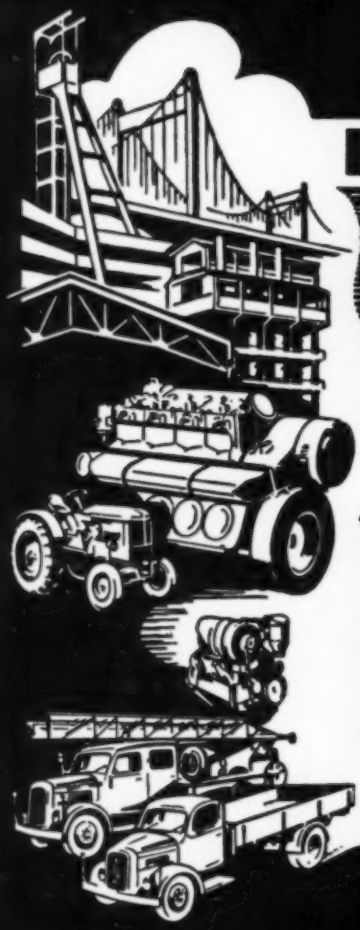
U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

2-685

UNITED STATES STEEL



HUMBOLDT

Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Mill Outfit, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges.

Since 1856

DEUTZ

Otto-, Gas-, Diesel-Engines for Every Purpose of Two- and Four-Stroke design, Output range 3–1500 H.P. Cooled by water or air, Diesel-powered tractors, Diesel locomotives, Gas producer plants.

Since 1864

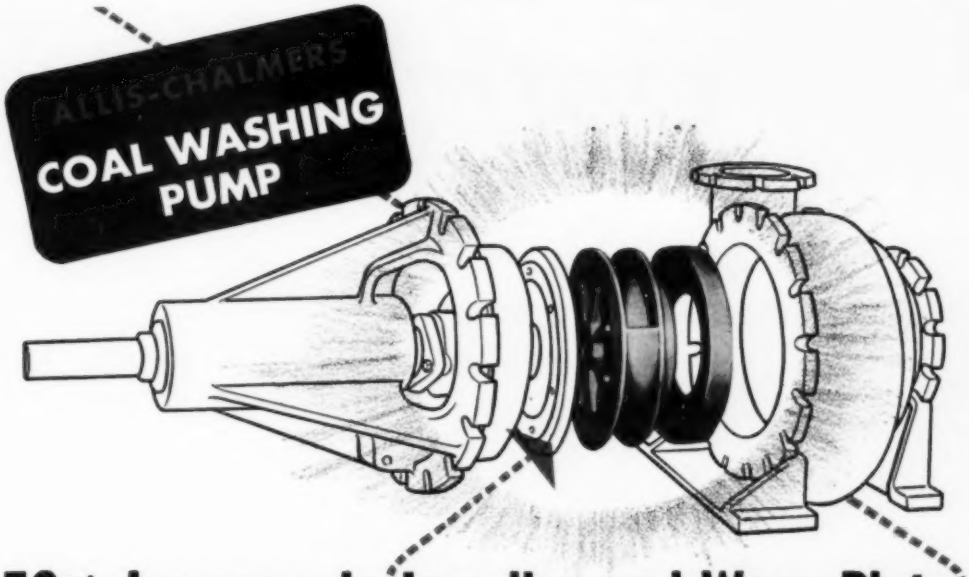
MAGIRUS

Trucks and busses driven by air-cooled DEUTZ Diesel engines, Vehicles for municipal services, Fire ladders, fire engines, Fire fighting water trucks, Two-wheeled ladders, Fire fighting equipment.

Since 1864

KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN U. ULM

Send inquiries to either Köln, Germany or Ulm, Germany



50% Increase in Impeller and Wear Plate Hardness Gives Longer Pump Life

COAL WASHING PLANT OPERATORS can now expect longer service than ever before from Allis-Chalmers Coal Washing Pumps. Impellers and suction wear plates, parts of the pump receiving greatest wear, have been increased from approximately 400 to 600 Brinell through the use of *Ni-Hard* for these parts as standard equipment at no extra cost. Replacement impellers and suction wear plates for Allis-Chalmers Coal Washing Pumps now in service can be furnished in *Ni-Hard*.

EASY TO SERVICE

All parts of the Allis-Chalmers Coal Washing Pump are easy to remove and replace. The rotating element can be removed and replaced in a half hour. Parts subjected to varying rates of wear are separated into easy-to-handle sections. Standardization of bearing support bracket parts makes many parts interchangeable between different pump sizes and reduces parts inventory when you operate more than one pump.

COMPETENT APPLICATION ENGINEERING

Allis-Chalmers application engineers are thoroughly familiar with all types of coal washing equipment problems. Allis-Chalmers can furnish you a complete pumping unit — pump, motor, control and drive — all of coordinated design and manufacture. For help on your coal washing problems, call your nearest Allis-Chalmers District Office. For more information on the A-C coal washing pump with *Ni-Hard* impeller and wear plate, write Allis-Chalmers, Milwaukee 1, Wis. for Bulletin 08B6381.

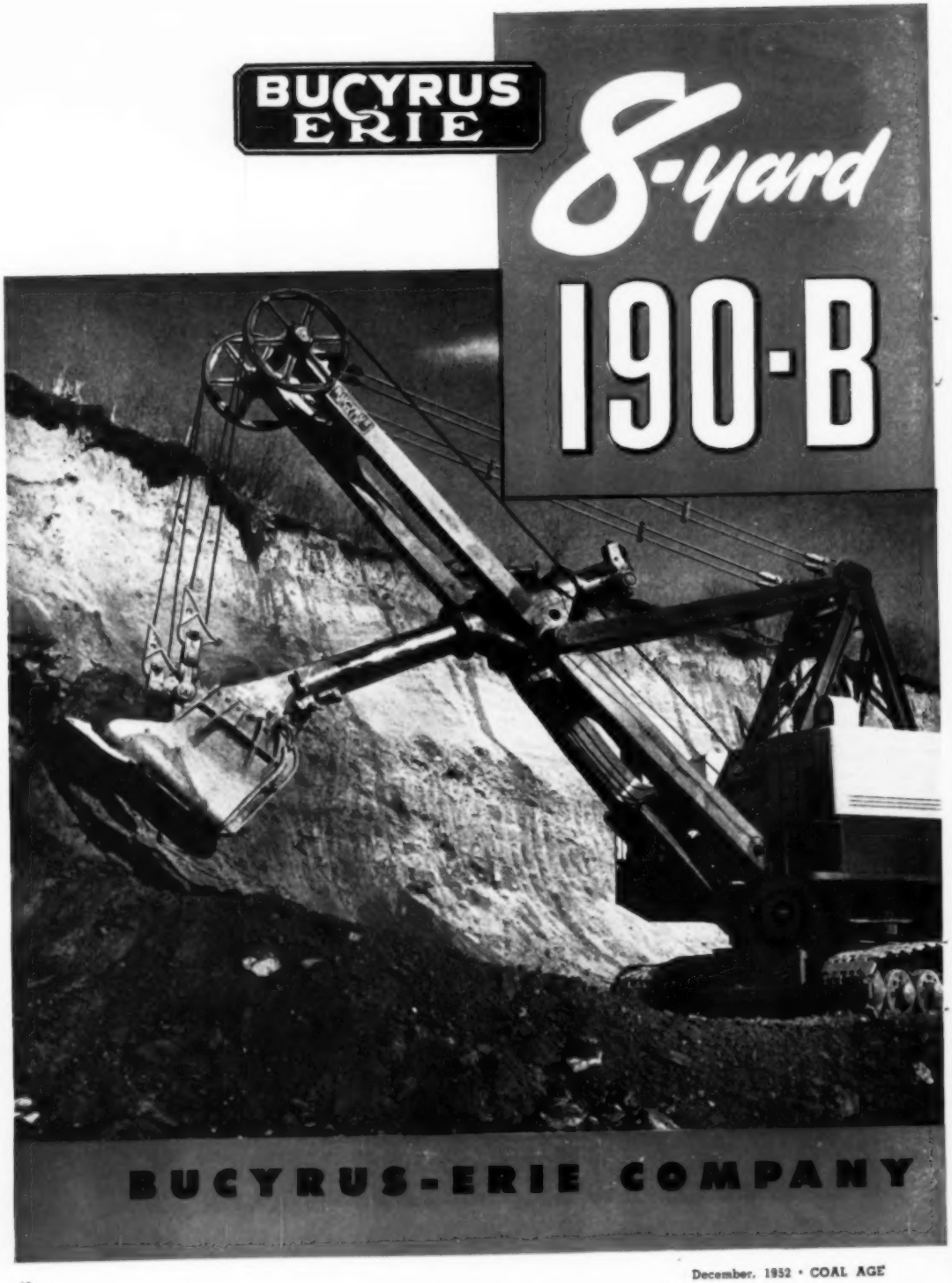
A-3896

Simple construction. Only five wearing parts: shaft sleeve, impeller, casting, two wear plates. All easy to handle and easy to replace.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Milwaukee 1, Wisconsin


BUCYRUS ERIE
8-yard
190-B
BUCYRUS-ERIE COMPANY

ANOTHER SMOOTH, FAST, BIG OUTPUT SHOVEL

for mines and quarries

The new 190-B follows the tradition of Bucyrus-Erie leadership in producing high quality excavators capable of delivering consistently big output at lowest possible cost per cubic yard. This 8-cubic yard shovel and dragline offers you many outstanding features — features that add up to greater capacity, higher output, and faster, smoother, more economical operation. Among these outstanding features are:

EXCLUSIVE TWO-SECTION BOOM

reduces shovel front-end weight, increases swing speed and payload capacity, yet provides ample strength for tough digging.

POWERFUL, MAIN MACHINERY

designed for double twin hoist, delivers power surely, smoothly, efficiently.

LARGER, STRONGER MOUNTING

provides ample strength for heavy duty and protective features for minimizing wear.

The 190-B has full Ward Leonard improved rotating control, is readily convertible to dragline service, and has numerous other outstanding features to meet the production demands of your toughest jobs.

SOUTH MILWAUKEE, WISCONSIN

"TENOL CUTS OUR OPERATING COSTS"

"Saves us Wasteful Downtime"

Says McCoy Coal Co., Jasper, Alabama

J. V. McCoy, President

The McCoy Coal Company moves 150,000 cubic yards of rock a week in its strip mining operation. It takes 9 excavators, 6 tractors and 5 dump trucks working at peak efficiency to maintain this scale of operations.

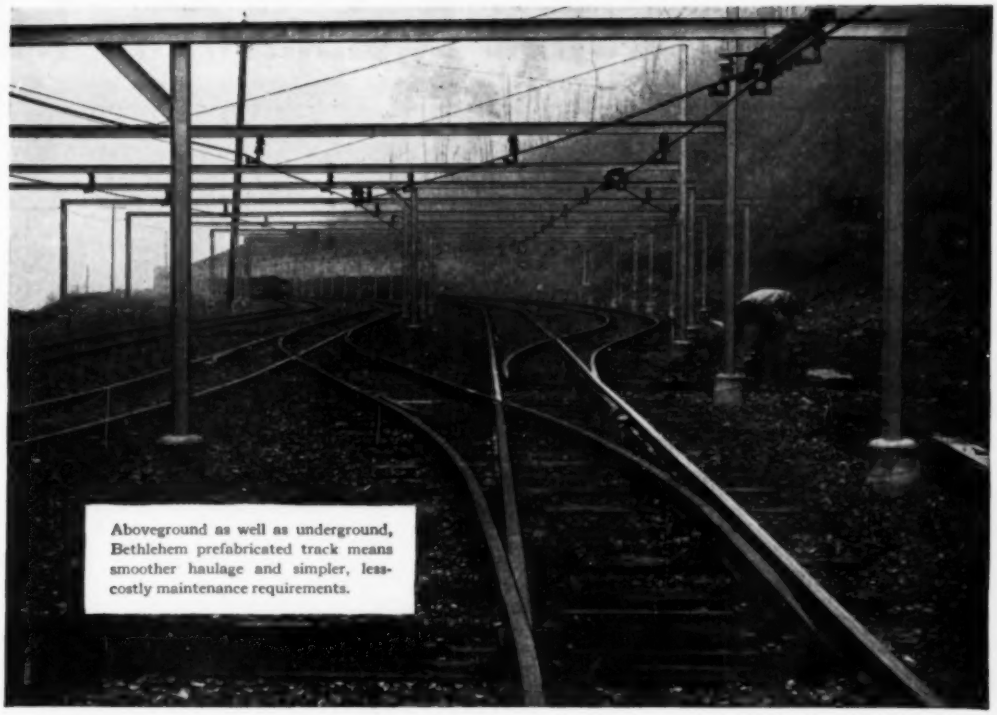
Sinclair lubricants play an important part in the prolonged life and the producing-power of the McCoy equipment. Exclusive use of Sinclair TENOL, for example, has proved its value in actual money and time saved. Mr. McCoy, president of the company says:

"We've used TENOL in our shovels, drag lines and tractors for 7 years. In that time, we've mined over 1,200,000 tons of coal and we've found that TENOL is an *outstanding* engine oil. It has saved us a lot of wasteful downtime . . . slashed our operating costs by cutting repairs. We've run engines *as long as 5 years* before breaking them down . . . they all were clean. We're more than satisfied with our rate of consumption – it's remarkably low. TENOL has had some tough tests with us . . . it's tops"

Let Sinclair help with *your* lubrication problems. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR TENOL

for Prolonged Engine Life



Aboveground as well as underground, Bethlehem prefabricated track means smoother haulage and simpler, less-costly maintenance requirements.

Here's Track where you can turn on the speed

No need to poke along at a snail's pace on this kind of mine track. It's built for high speeds and safety. Built to satisfy future as well as present haulage requirements.

This is a Bethlehem prefabricated track job—new, up to the minute, tailored to the mine's every need. Heavy rail, properly-curved turnouts. Sturdy, shock-resisting guard rails and braces. Easy-acting switch stands. Everything complete, down to the last fastening and joint bar.

Your own haulage problems may be different from those of the mine shown here. But whatever they are, Bethlehem can be of real help when you require changes, additions, or something entirely new. We go about it like this: first, a study of your workings; next, a plan designed for your individual mine; then, after approval of details, the cutting, curving, and fabrication of track itself.

We know that a system so designed—whether for surface or underground use—will serve you well for years to come. Remember, it isn't something pieced together from stock. It's a custom job, with *your own particular needs* the basis of every recommendation. It's track designed for speed, convenience, safety, and low-cost haulage.

Full details about Bethlehem prefabricated track are available through the Bethlehem office near you. Ask for the story; naturally, you won't be obligated in any way.

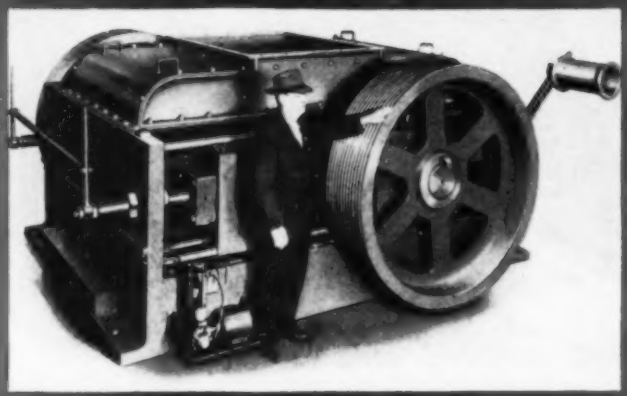
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

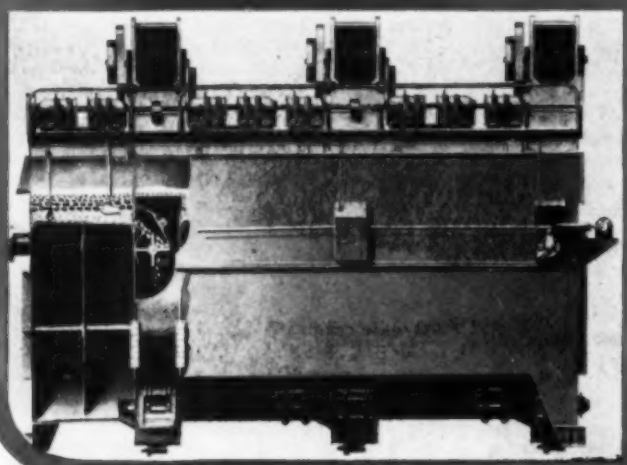
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM PREFABRICATED TRACK

Preparation Equipment to help



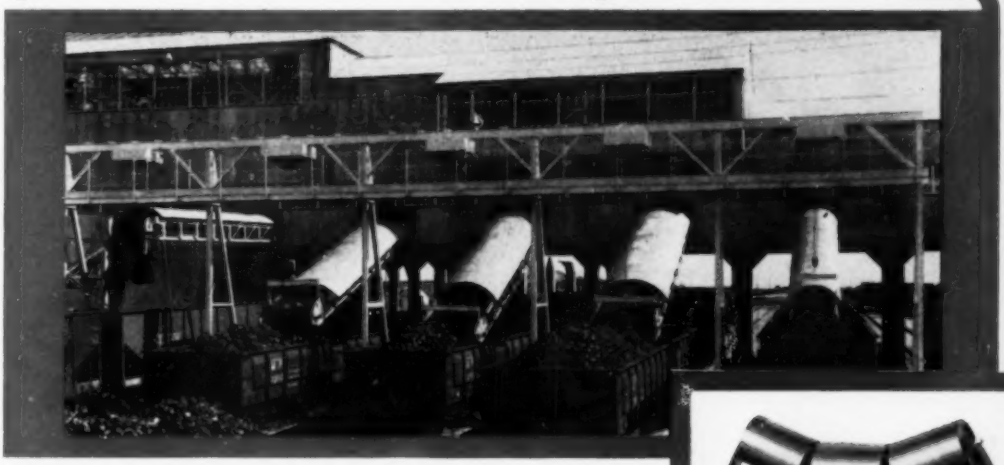


Lump coal can be picked best by hand. Hence, in many washeries the picking table is an essential unit. Picking tables may be apron or belt types but the apron type shown above is by far the most popular unit. Tables have their moving edges guarded—chutes along sides carry rejects away. They are often extended to form the hinged loading boom.

Powerful, heavy duty Double Roll Crushers (left) are capable of handling the entire output of the mine—will crush anything coming from the face without preliminary sizing or picking. A variety of sizes—adjustable to provide just the product you want. Jeffrey also builds Single Roll—FLEXTOOTH—and FLEXROLL Crushers.

More coal is cleaned with Jigs than with all other types combined. Illustrated is a three-compartment, eight cell Baum Jig. Jeffrey Jigs provide clean coal—reject clean refuse—have a wide range of capacities—handle coarse or fine coal—are compact and economical. Jeffrey service includes design and erection of complete cleaning plants. Let us help you meet the demand for quality coal.

you meet Market Requirements



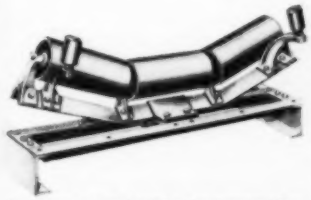
Jeffrey Loading Booms can be furnished either apron, belt or flight type to suit loading conditions. Each is designed to provide the least possible drop so that degradation is reduced to a minimum. Raising and lowering of booms remotely controlled by one man from a centrally-located control station.

Jeffrey-Traylor Feeders like the one shown below provide a highly efficient and economical means of regulating feed to other units. Balanced high frequency vibration—absolute control over tonnage handled. No moving parts—nothing to wear out or require lubrication. Feeder will operate level, up or downgrade. Rate of feed changed at will—capacities up to 1500 T. P. H.

Jeffrey Belt Conveyors reflect the sound engineering and experience of our Engineers. They know that a belt conveyor functions no better than the Idlers (right) upon which the belt carries material. It's important to know the right type of Idler to specify—Jeffrey has a complete line of them for every service—belt widths from 14" to 60".

Standard and Heavy Duty 3-pulley roller bearing Idlers for belt widths from 14" to 60"

Standard Ball or Roller Bearing Return Idlers



Positive type pivoted, Belt Training Carrying Idlers

THE JEFFREY

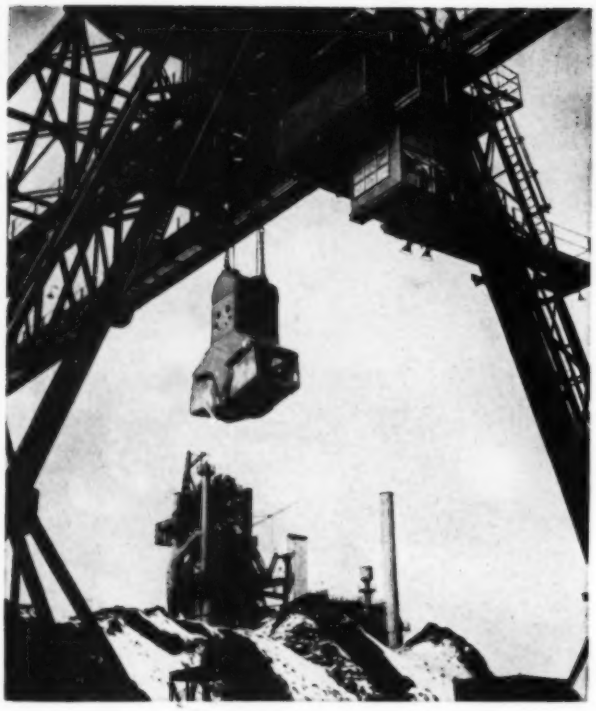
1877 75 1952

MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

Baltimore 2 · Boston 16 · Cincinnati 2 · Detroit 13 · Houston 2 · New York 7 · St. Louis 1
Beckley, W. Va. · Buffalo 2 · Cleveland 15 · Forty Fort, Pa. · Jacksonville 2 · Philadelphia 3 · Salt Lake City 1
Birmingham 3 · Chicago 1 · Denver 2 · Harlan, Ky. · Milwaukee 2 · Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada · *The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio*
British Jeffrey-Diamond Ltd., Wakefield, England · *Galion (Great Britian Ltd.), Wakefield, England*
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A. · *The Ohio Malleable Iron Co., Columbus, Ohio*
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio



During 1953...

When Your BETTER PRODUCTION PLANS *Call For* Heavy Bulk Materials Handling Equipment

Depend On *Heyl & Patterson* *For* Advanced Design *and* Controlled Low Cost

The Heyl & Patterson "TURN-KEY WAY" is a plan of operation wherein each essential function, from design to guaranteed successful operation is performed completely within our own organization.

The "TURN-KEY WAY" enables Heyl & Patterson to guarantee successful operation and Controlled Low Cost.

It calls for Engineers, Fabricators and Erectors instilled with the urge for constant improvements . . . improvements based on actual past experience and on modern thinking and planning with one objective . . . *Designing, Fabricating* and *Erecting Better Heavy Bulk Materials Handling Equipment.*

Heyl & Patterson Engineers have undivided responsibility for the successful operation of all H&P projects. They call the signals and then the H&P Team goes into action.

We have *OUR OWN* Engineering Department . . . *OUR OWN* Research Department . . . *OUR OWN* Structural Shop . . . *OUR OWN* Machine Shop . . . *OUR OWN* Erection Department.

All departments work in complete harmony with a mutual understanding that the completed project has to be another tribute to the world-wide reputation of Heyl & Patterson.

- Ore Bridges
- Railroad Car Dumpers
- High Lift-Turnover-Rotary
- Coal Preparation Plants
- Coal & Coke Handling Equipment
- Boat Loaders and Unloaders
- Rotary Mine Car Dumpers
- Coal Crushers
- Coal Storage Bridges
- Car Hauls and Boat Movers
- Bradford Breakers
- Refuse Disposal Cars
- Thorsten Coal Sampling Systems
- Kinney Car Unloaders
- Pig Iron Casting Machines
- Cyclone Thickeners
- Thermal Dryers
- The Drying Dutchman
- Reineveld Centrifugal Dryer

Heyl + Patterson, Inc.

"SINCE 1887"

Heavy Bulk Materials Handling Equipment

All The Way from Design to Erection

55 WATER STREET · PITTSBURGH 22, PA

My Sweetheart's No Longer "A Mule in The Mine"...

Reliance Totally-enclosed, Non-ventilated, Explosion-proof Motor; one of several Reliance motor types especially developed for the mining industry.

Wise operators nowadays provide their miners with dependable, economical Reliance Type 'T' Heavy Duty Motors. These rugged motors power 95% of all rubber-tired underground haulage... 70% of all coal loaders... and increasing numbers of other underground machines performing the toughest jobs in mining.

Type 'T' motors embody refinements developed by Reliance engineers working closely with users in the application of thousands of motors to the coal-mining industry. Especially designed, electrically and mechanically, for difficult underground jobs, Reliance motors have vital parts thoroughly protected against coal dust, moisture and other hazards encountered in the toughest mining jobs. They *stay* clean and dry... last longer with less maintenance.

The result... you enjoy exceptional freedom from tonnage losses due to motor failures.

Reliance Type 'T' Motors are available in ratings from ¾ to 100 hp. to meet standards of the Bureau of Mines for use on "permissible" equipment. Low height and compact design satisfy space limitations of underground applications.

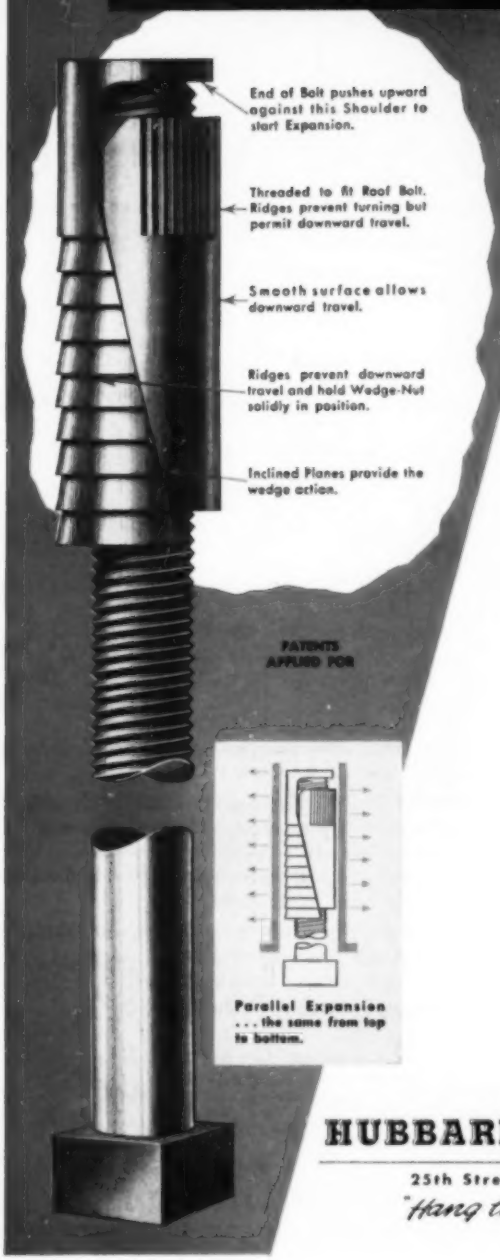
Next time you order new equipment, specify Reliance. See for yourself how these *tough* motors keep production up... and costs down.

Write for Bulletin C-2001 describing the complete line of Reliance Type 'T' Motors through 1000 hp.

RELIANCE ELECTRIC AND ENGINEERING CO.

1095 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities

For Greatest Safety...



HUBBARD
EXCLUSIVE PARALLEL EXPANSION
ROOF BOLT

THE design of the Hubbard Mine Roof Bolt embodies marked advantages over other types of roof support, in ease of installation, tested holding strength, adaptability to conditions encountered, and provision for maximum head working room and haulage-way clearance. Note these distinctive features:

1. The sides of the shell are constantly parallel during expansion, giving full length gripping surface, not dependent on point contact.
2. The bolt does not have to be inserted to the full depth of the hole or to an exact, mathematically predetermined depth. This makes it possible to take advantage of the strata at any chosen depth and shows up in decreased drilling costs.
3. Torsion while tightening the bolt can be varied to any determined degree to give a desired resultant tension.
4. If holes are not perfectly straight, the Hubbard Bolt will enter where many others will not, and no installing tool clearance is required.
5. The Hubbard Roof Bolt gives maximum head room; only the bolt head and support plate project below the roof.
6. The Hubbard Roof Bolt is the simplest in design, the easiest and quickest to install. No special tools are required.

HUBBARD ROOF BOLT COMPANY

25th Street and Guyan Ave., Huntington, W. Va.

"Hang the Load on Hubbard Hardware!"

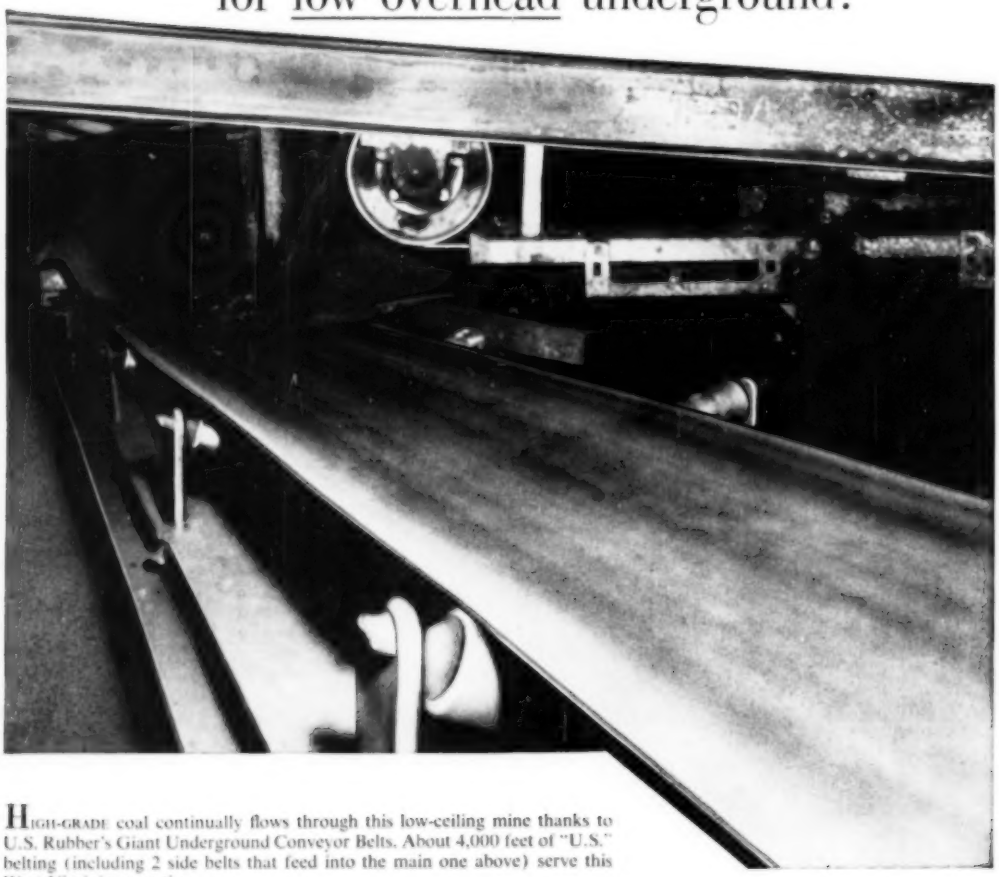
Come Ye, Rejoice

Somehow, He seems closer at Christmastide. It's a time when the old folks feel like kids again. When the young heart is happiest. But for every man of good will—young or old—it's a time to rejoice.

To the men in the great Coal Industry, whose hands help shape America's high standard of living and ultimate destiny, our warmest wishes for a Merry Christmas and a prosperous, peaceful New Year.

AMERICAN CAR AND FOUNDRY COMPANY

What's U. S. Rubber doing for low overhead underground?



HIGH-GRADE coal continually flows through this low-ceiling mine thanks to U.S. Rubber's Giant Underground Conveyor Belts. About 4,000 feet of "U.S." belting (including 2 side belts that feed into the main one above) serve this West Virginia operation.

Mines like this one, with extremely thin coal seams, need the most practical conveyance system possible to make them worth working. Conveyor belts keep overhead at a minimum because they require much less operating space than other conveyor systems. Smaller tunnels, simplified timbering, more mobility, healthier, safer operation—these are other advantages made possible by U.S. Giant Conveyor Belts.

For over two years now, this "U.S." belt has weathered the terrific beating of low-mine service, maintained alignment and has not required costly repairs. You can expect the same high standard of service provided by "U.S." technicians, no matter how complex your conveyor problem may be.

PRODUCT OF U.S. RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

How to Reduce Roof-Fall Accidents

You can minimize the chances of roof-fall accidents, making your mine safer and more productive, by using Bethlehem Roof Bolts in place of old-fashioned, space-consuming supports.

Bethlehem Roof Bolts promote safety because they tend to consolidate several layers of roof strata into a single-unit, thick beam. They also offer these other advantages: (1) increased economy, (2) faster transportation, (3) less material-handling, (4) wider mine openings, and (5) improved ventilation.

Bethlehem Roof Bolts are furnished in two types, each one designed to meet certain conditions. The

bolts come in a wide variety of lengths, and can be used vertically or at angles. For full information write to us at Bethlehem, Pa.

◀ BETHLEHEM SQUARE-HEAD BOLT
(With Expansion Shell)

This assembly consists of unchamfered square-head rolled-thread ¾-in. bolt, plug, and expansion shell. Bolt shank has two pressed ears, to support shell during anchoring. Plug is forced into shell when bolt is tightened, expanding leaves of shell to provide proper holding-tension. Leaves have sharp projections which contact sides of the hole, to prevent shell from turning when bolt is rotated.

BETHLEHEM SLOTTED BOLT ▶

Has forged slot to accommodate wedge. The slot is centered by an exclusive process which forms the equivalent of two half-rounds. Other end of bolt has 5 in. of 1-in. rolled threads. When driven against back of hole, wedge is forced deep into slot, expanding bolt-ends to provide tight grip. Truncated-cone point helps prevent thread damage. Comes with American Standard Regular Square Nut.

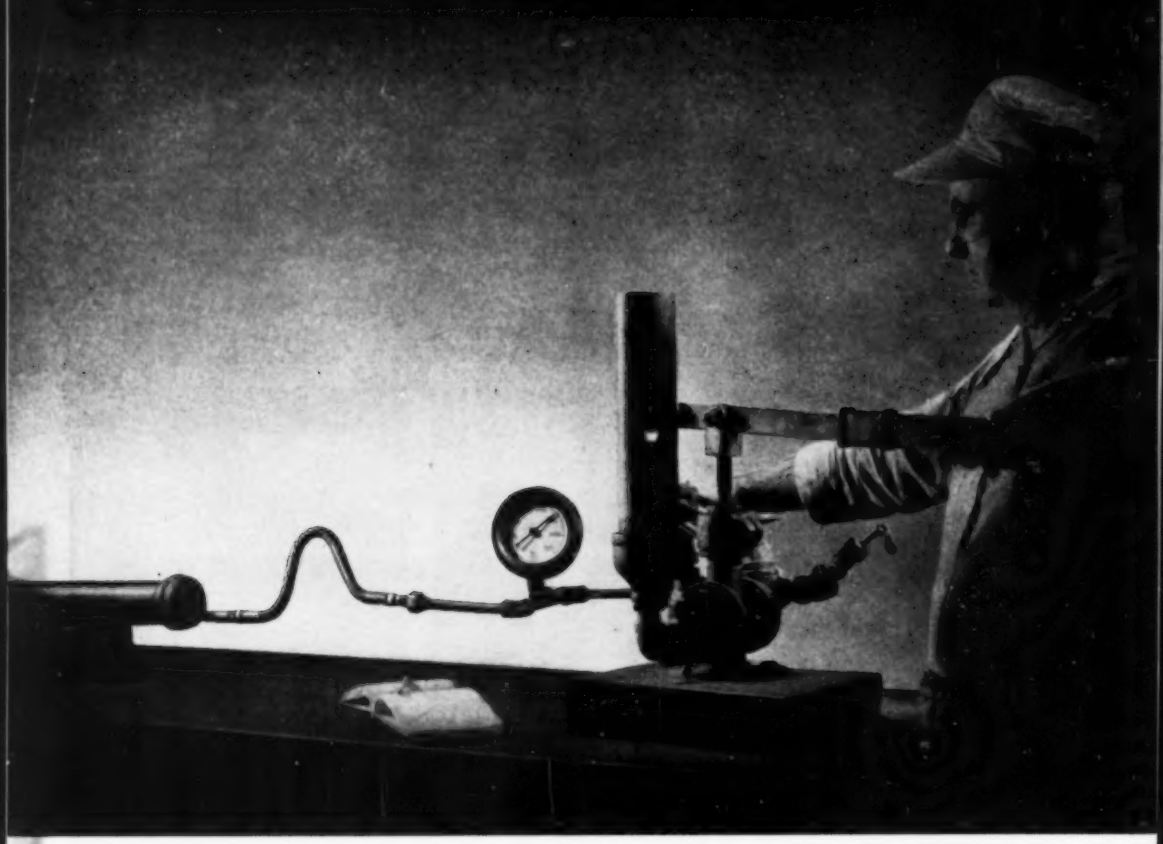
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM MINE ROOF BOLTS

PROGRESS IN EXPLOSIVES . . .



FOR WORKING UNDER PRESSURE

Hercules' research has developed explosives that shoot successfully even under the severe water pressures encountered today in seismograph prospecting.

In the laboratory test shown here, a cartridge of Hercules Vibrogel® 3 is sealed in the steel "bomb" at the extreme left. It then undergoes prolonged exposure to pressures greater than those ordinarily found in actual field use. Because Vibrogel 3 embodies a new conception of explosives research, it detonates despite these extreme conditions.

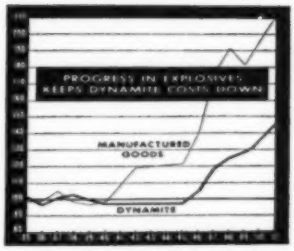
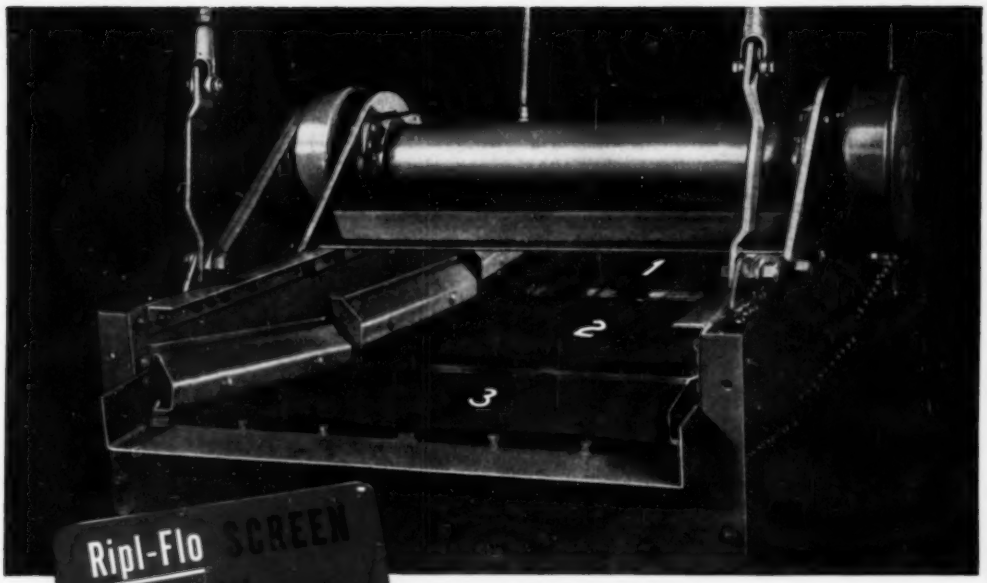


Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods, 1935-39 values=100.

HERCULES POWDER COMPANY
INCORPORATED

Explosives Department, 936 King St., Wilmington 99, Del.

XR52-7

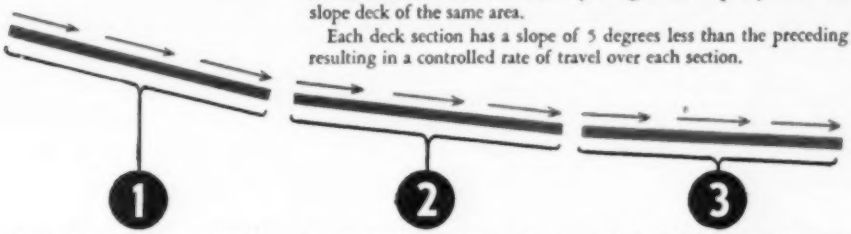


Ripl-Flo SCREEN with Tri-Slope DECK

Screens Moist Fine Coal

NO EXCESSIVE BLINDING and no shut-downs to clear the screen! With the "Tri-Slope" deck you can screen moist ½ x 0 to ¼ x 0 coal with 5% surface moisture at 10 mesh. And you'll get more capacity than with a single slope deck of the same area.

Each deck section has a slope of 5 degrees less than the preceding section, resulting in a controlled rate of travel over each section.



Moist, fine coal passes rapidly over the feed end section to reduce the depth of the bed.

The coal is retarded on the intermediate deck to maintain proper bed depth.

It is slowed down still more on the discharge end section to pass marginal size coal.

Each section of the "Tri-Slope" deck is designed for rapid stratification of the bed, resulting in high capacity. Moist, clogging particles are dislodged by the *Sta-Kleen* feature, consisting of bouncing rubber balls between the screen cloth and a ball retaining deck. The A-C representative in your area will gladly give you more details. Call him, or write Allis-Chalmers, Milwaukee 1, Wis.

Ripl-Flo and Sta-Kleen are Allis-Chalmers trademarks.

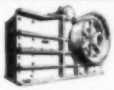
ALLIS-CHALMERS A-C ALLIS-CHALMERS

A-3854

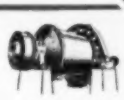
Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Hammermills

Vibrating Screens


Jaw Crushers

Gyratory Crushers


Grinding Mills

Kilns, Coolers, Dryers

A Forecast by MARION

THIS NEW MARION 191-M . . . .

. . . . is the world's biggest loading shovel—the biggest two-belt crawler shovel built. It is shown at work loading stone for a big construction project in Kansas. The 191-M has loaded up to 1,600 yards an hour in big 10-yard bites that fill trucks in the 50-ton class in 3 passes.

MARION predicts the 191-M will have a bright and busy future in coal mining. For many reasons, it will have important applications in both bituminous and anthracite strip mining. Some of the reasons:

- 10 Cu. Yd. Standard Shovel with 43'8" Boom & 27'4" Handle
- 7 Cu. Yd. Long Range Shovel with 65' Boom & 40'4" Handle
- All-Electric or Diesel Electric Power, Ward-Leonard Control on Both
- An extremely Heavy-Duty Shovel with Small-Machine Cycle Time
- Greater Travel Speed and Maneuverability than most smaller machines

For more of the reasons, write, wire or phone Marion Power Shovel Co., Marion, Ohio. Since 1884. Offices in all principal cities.

THE IMPROVED

Exide-Ironclad

BATTERY

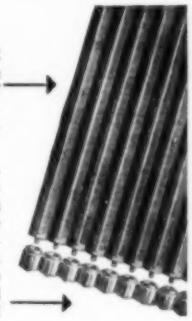
GIVES you more . . . SAVES you more

It gives you more of everything that adds up to top performance, long battery life . . . saves you more through low over-all costs. Outstanding new features, including the polyethylene insulating tube sealer, *more than ever before*, make Exide-Ironclad YOUR BEST POWER BUY . . . AT ANY PRICE.

HERE'S WHAT YOU GET

Rapid, high production haulage, more trips per shift . . . High maintained voltage, with uniform speed to end of shift . . . High availability . . . Low operating costs . . . Low maintenance costs . . . Low depreciation costs . . . Safety from hazards of fire and fumes.

AND HERE'S WHY



IMPROVED POSITIVE PLATE CONSTRUCTION. The long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which makes them highly corrosion-resistant.

NEW POLYETHYLENE INSULATING TUBE SEALER of acid-proof, non-corroding plastic. It fits snugly into slotted tubes of positive plates, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.

PLUS THESE EXTRAS

IMPROVED NEGATIVE PLATES for higher electrical efficiency.

NEW SEALING COMPOUND provides permanent seal between jar and cover.

SEAMLESS SHOCK-PROOF JAR, of high-quality rubber. A scientifically selected combination of tensile strength and elongation provides a sturdy jar built for long-life and heavy-duty service.

NEW UNBREAKABLE PLASTIC VENT PLUGS of polyethylene.

TYPES, SIZES AND CAPACITIES for battery-electric mine haulage units of every make.

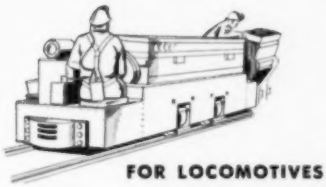
THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

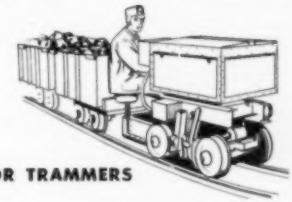
1888

DEPENDABLE BATTERIES FOR 64 YEARS

1952



FOR LOCOMOTIVES



FOR TRAMMERS

FOR SHUTTLE CARS

Exide-Ironclad

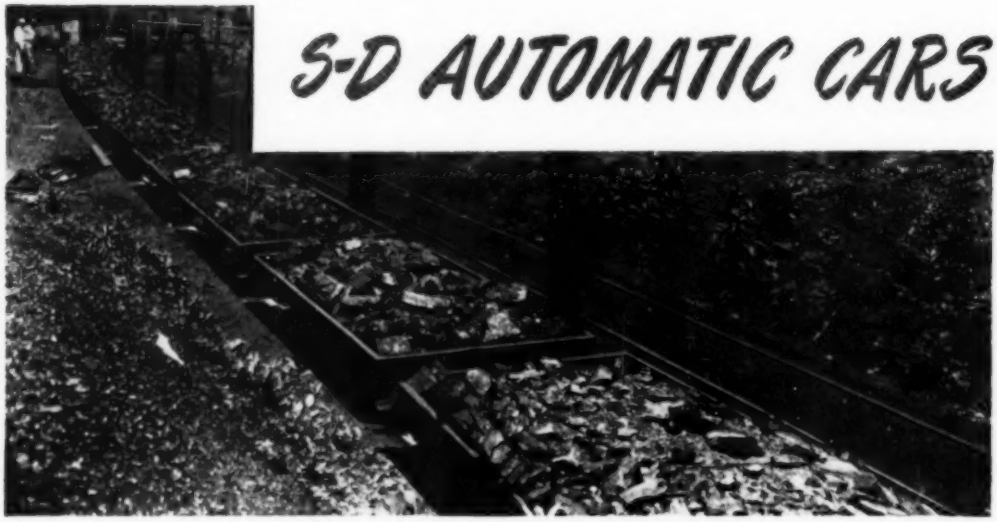
IS YOUR BEST POWER BUY

. . . AT ANY PRICE

POWER

"EXIDE-IRONCLAD" and "SILVIUM" *Reg. T.M. U.S. Pat. Off.*

Reduce Man-Hour Cost these 5 ways with...



1. **Eliminate all manual operation at tipple . . .** S-D Automatic Drop Bottom Cars discharge the coal automatically. When each car in trip approaches opening between rails over Surge Bin, an automatic tripping device unhooks the drop bottom doors. As each car leaves Surge Bin a closing device automatically closes and re-hooks the doors as trip continues back to mine for re-loading.

2. **Use fewer trip crews.** The non-stop haulage provided by S-D Automatics gets longer trains of cars back to the mine faster.

3. **Operate preparation plant with only one shift.** Usually, a one shift operation at the preparation plant will balance a two shift operation in the mine. The Surge Bin continues to take the coal as it is mined, storing it for smooth flow to preparation plant during a one shift operation.

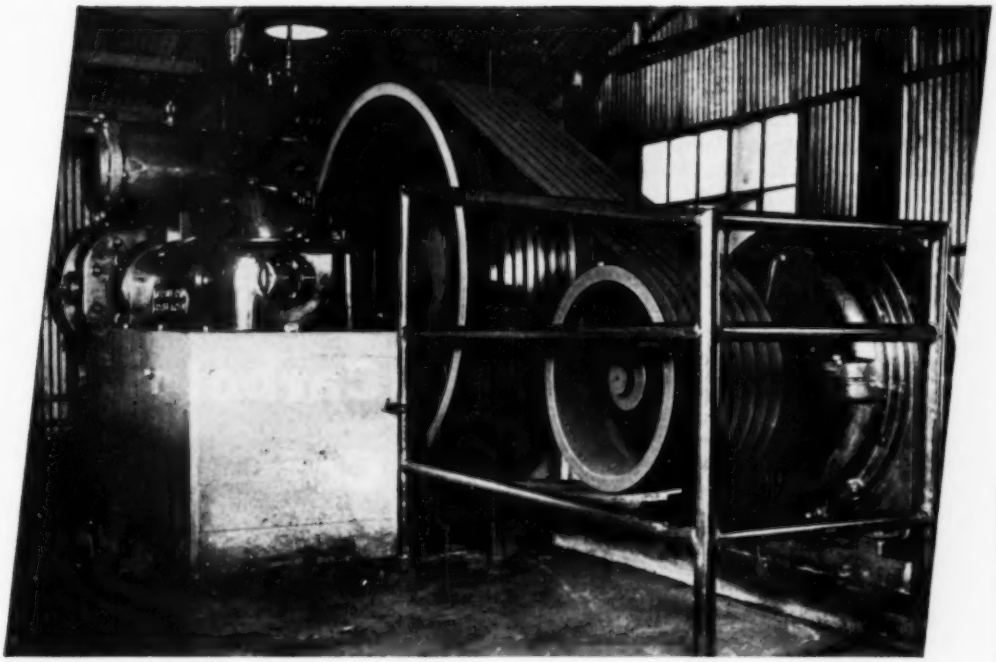
4. **Prevent your preparation plant crew from standing idle because of delays at the face.** With S-D Automatics and an adequate Surge Bin, your preparation plant continues to take coal from the Surge Bin when there is a delay at the face.

5. **Avoid the costly down time of crews standing idle at the face because of delays at the preparation plant.** Remember, when there is a delay at the preparation plant, the Surge Bin continues to take the coal as it is mined.

Have one of our engineers show you how much money S-D Automatics can save you by reducing man-hour costs. Without question, S-D Automatics offer you the lowest cost method of main line haulage!

SANFORD-DAY IRON WORKS

KNOXVILLE, TENNESSEE



Keep your production in the groove with Thermoid V-Belts

Production men, in all kinds of industries, rely on the greater strength and longer life in Thermoid V-Belts to provide smooth, efficient performance and long wear . . . keep production in the groove.

From huge multiple V-Belts of rayon grommet construction to the smallest fractional horsepower belts, you can always depend on Thermoid quality.

The result is V-Belts with minimum stretch and extreme flexibility . . . designed to transmit maximum power without slippage . . . able to withstand high speeds and absorb shock.

All these advantages add up to lower operating and maintenance costs, and in the long run, the most economical V-Belts you can specify for the job.

Call your nearest Thermoid distributor today. He has a complete range of sizes to meet your requirements. And for your special V-Belt problems, experienced Thermoid Sales Engineers are always ready to help you.

Thermoid Industrial Rubber Products Quality Service

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Seven Mine-Proved Ways Carboloy Coal Mining Tools Help Offset Mounting Production Costs

Here is a promise on which you can expect *immediate delivery*. Tool up with Carboloy Coal Mining Tools and start at once to reap important benefits, day by day, shift after shift. Tons mined per shift increase immediately – downtime and costly delays dwindle – with the improved, newly expanded line of Carboloy Coal Mining Tools. Check these benefits:

1 Carboloy Coal Mining Tools are reported to cut more coal per shift than ordinary tools under equal conditions. **2** They stay sharper longer between grinds, reducing time wasted in bit changing. Keep costly machinery operating more of the time. Reduce equipment and labor costs per ton. Boost production per man. **3** Provide long tool life. **4** Take more regrinds per tool. **5** They are more efficient, need less power. **6** Make clean cuts, with less wear on expensive machinery. **7** Require less conditioning and are back on the job quickly.

Free Technical Services

To make sure you get all the benefits Carboloy Coal Mining Tools can deliver, use these helpful Carboloy services.

1. Complete training course for key personnel. Features instruction and demonstration in best grinding practices. Features special discussions with your men on cemented carbide use in relation to the most efficient carbide-maintenance practices.

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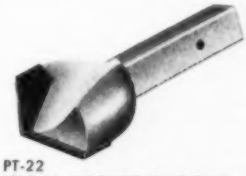
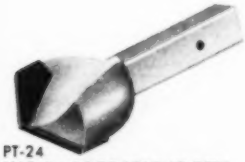


PT-22
1⅜"-dia. ROOF BOLTING DRILL
Solid type



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Send at once my copy of the illustrated maintenance-instruction manual and Catalog CM-100E.

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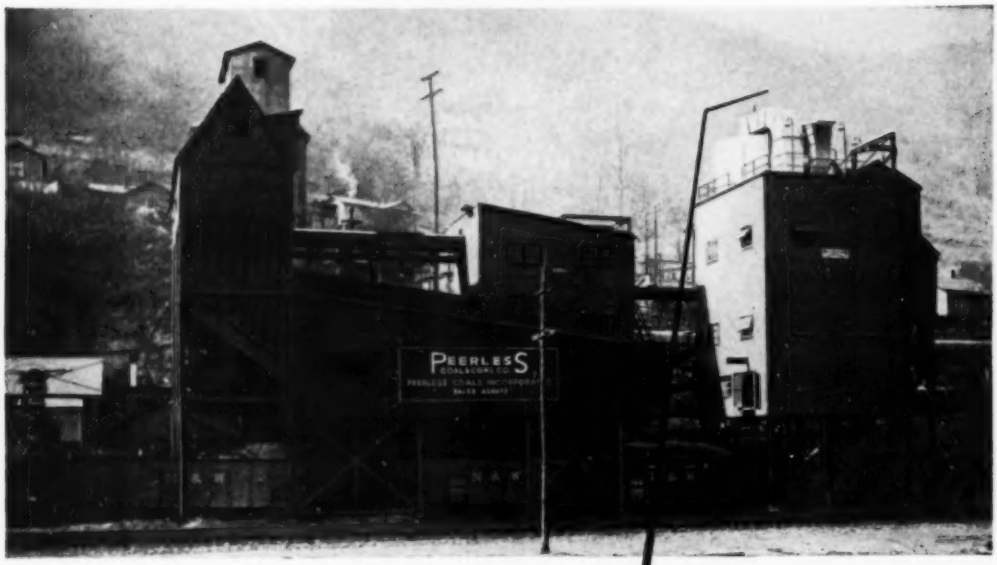

Recently completed addition to Peerless Coal and Coke Company plant, Vivian, West Virginia. Engineered and constructed by Roberts & Schaefer Company.

R & S COMPLETES "Operation Modernization" AT PEERLESS

Completion of the new plant addition shown here is the latest step in the "Operation Modernization" that began at Peerless Coal & Coke Company twenty-five years ago.

This latest R&S-engineered addition is built around R&S Super-Airflow units designed to air-wash fine coals. Thus, it complements the original R&S-engineered plant and other R&S-engineered additions which have done a highly successful job of wet-washing larger sizes.

With this installation, Peerless joins with other progressive operators who have accepted the Roberts & Schaefer Co. system of combination water- and air-washing plants. The annual installed capacity of Roberts & Schaefer Hydro-Separators and Airflows now totals 50,000,000 tons.

Whether wet-washing or air-washing is the answer to your preparation problem—or whether the answer is heavy-media separation or some other process—you are assured of authoritative, unbiased counsel when you consult Roberts & Schaefer Company.

An ever growing list of repeat customers like Peerless is your assurance of complete satisfaction.

FIRE!

Mr. Frank Mueller, President
Roberts & Schaefer Company
130 North Wells Street
Chicago 6, Illinois

Dear Mr. Mueller:

We wish to express to you and your company our appreciation for your very prompt and efficient assistance in helping us get back into production after our disastrous tipple fire July 26. Although our slack and stoker coal screening facilities were completely destroyed, we were able to completely install new permanent facilities so as to be in complete operation on August 20. Through your cooperation, we actually lost only 3 full days of operation. Your representative was on the job the day after the fire and your construction crews were working the next day. The ingenuity and diligence of your engineering and construction representatives and crews made possible this remarkable recovery record.

Our thanks to you, Mr. R. G. Miller, Mr. Jack Clark and your crews for making this fine record possible.

PEERLESS COAL & COKE COMPANY
Roland C. Luther
Executive Vice President

ROBERTS & SCHAEFER COMPANY

130 North Wells Street, Chicago 6, Illinois

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TYPE 2400
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Over-all height 40½"*

Rubber-tired universal cutting machines

- ✓ TOP CUTS
- ✓ CENTER CUTS
- ✓ BOTTOM CUTS
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No blind spots from top to bottom, from rib to rib

Fast cutting, fast tramming machines with the capacity to set the pace for high productive loading units in trackless mining systems.

Full hydraulic control . . . Easily maneuvered . . . Wide horizontal cutting range . . . Wide vertical range . . . Dual controls . . . Rugged construction . . . Unit assembled.

* Over-all height same as that of tires used. Larger tires optional.

Your inquiry for complete details is welcomed.

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Cutting Machines · Conveyors · Loaders · Shuttle Cars · Locomotives

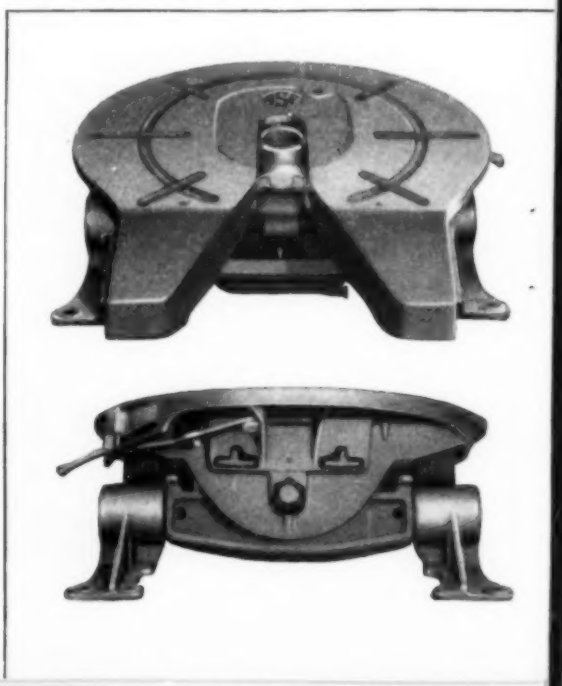
One of two tandem units, used in Marquette Cement Company's quarry at Oglesby, Ill. Heavy duty, side-oscillating ASF 5th wheels are standard equipment. Gross weight, including tractor: 175,000 pounds; gross weight hauled by front 5th wheel, 160,000; net payload, 80,000.

40,000 pounds—down the hatch!

If you are looking for an operation that punishes 5th wheels, take a look at how they're used off the highway! That's where you will find them subjected to tough service. Heavy payloads, plus continuous use day in and day out over rough roads give these 5th wheels a beating. No "beefed" up highway 5th wheel will stand up in this service!

Heart of the tandem—the ASF 5th Wheel

Here's the 36" extra-heavy-duty ASF Safety 5th Wheel made especially for the rugged service and heavy loads found in off-highway work. Cast alloy steel gives it the strength needed for handling loads up to 100 tons . . . side oscillation gives your units the flexibility needed to absorb the twisting side-strains of uneven roads.



The Marquette Cement Company proves that your best investment for safety and heavy-duty service is an ASF Safety 5th Wheel . . .

"best 5th wheel we've ever used"

Quarry work—just by the nature of the operations involved—gives most any kind of equipment a beating. And 5th wheels get their share!

As a case in point, take Marquette Cement Company's quarry in Oglesby, Illinois, where side-dumping tandem units are operated, each unit with 40,000 pounds net load. Read what Bill Spurr, Quarry Superintendent, has to say about his firsthand experience with ASF Safety 5th Wheels:

"We have been using ASF Safety 5th Wheels exclusively on our 4 tandems and 2 semi's for the last 6 years. The wheels we used before that time often took an hour or more to uncouple, but the problem was solved quickly by switching to ASF wheels. Now it doesn't take us more than 10 minutes to couple or uncouple.

"In the case of our tandem units, the front 5th wheel is often pulling over 160,000 pounds gross weight. On top of this, rough roads put a heavy, twisting strain on these 5th wheels."

"That's tough service, and these ASF Safety 5th Wheels are the best 5th wheels we've ever used."

There are sound reasons why ASF 5th Wheels can stand up in tough service. For example, the "I" beam crossbar is a recent development that helps the ASF 5th Wheel keep pace with the stresses of heavier equipment carrying heavier loads. King-pin bearing area is the largest of any 5th wheel made. Coupling is quick and easy—but uncoupling is impossible when the easy-to-see lock lever is in "locked" position. Side oscillation adds flexibility to your entire unit—tractor and trailer—so that it "rolls with the punch" instead of rigidly resisting the side strains of uneven roadway.

For complete freedom of interchange between motive power and load-carrying equipment, you can't top the quick convertibility of the *tractor trailer*. And, for the facts on the best 5th wheel investment you can make, see your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever position. The easy-to-see lever can only be in this position when the jaws are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety dog up, and pull the lever forward.

UNLOCKED—and ready for coupling. The lever moves back to locked position only when the jaws are locked!

A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING—as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING—3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.

3 profit-making reasons

why your equipment should be built

By the use of U·S·S COR-TEN steel, this 28½ cubic yard dump trailer built by Trailmobile Co. was made stronger and more resistant to corrosion. But what's more, its weight was reduced by 1,000 pounds. That means it can haul 1,000 pounds more payload without any increase in loaded weight over a similar unit built of ordinary steel. And the extra cost for all of this? Only thirty dollars!

U·S·S COR-TEN STEEL

U·S·S Cor-Ten is a ductile, low-carbon chromium-nickel-silicon-copper-phosphorus steel having a minimum yield point, in thicknesses of ½" and under, of 50,000 psi—at least one and one-half times that of structural carbon steel.

It has a minimum tensile strength of 70,000 psi in these same thicknesses. Its resistance to abrasion, shock and impact is superior to that of structural carbon steel; its fatigue resistance—that is, its ability to withstand vibration stresses, is 60% greater.

What particularly distinguishes U·S·S Cor-Ten steel is its unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel, 2 to 3 times that of copper steel. It is this property that helps to assure the safety, long life and low maintenance cost of any equipment in which Cor-Ten steel is used to obtain greater durability, or in lighter thicknesses to reduce weight.

U·S·S Cor-Ten steel is produced in all standard products—plates, shapes, bars, sheets, strip, special cold formed sections, wire and tubular products. It is recommended particularly in light and intermediate thicknesses.

U·S·S TRI-TEN* STEEL

This manganese-nickel-copper steel has a yield point of 50,000 psi min. and a tensile strength of 70,000 psi min. in thicknesses ½" and under, with moderately lower values as thickness increases to a maximum of 4". It has superior toughness and ability to withstand shock at sub-zero temperatures. It has greater resistance to abrasion than structural carbon steel (ASTM A7) and its fatigue resistance is 30% higher. U·S·S Tri-Ten steel's resistance to atmospheric corrosion is slightly superior to that of copper steel.

Because U·S·S Tri-Ten steel has very good welding properties in intermediate and heavier thicknesses, this grade is particularly recommended for application in heavy-duty equipment, such as illustrated (right), where maximum ruggedness and strength with minimum weight are prime requisites.

U·S·S Tri-Ten steel is produced in plates, structural shapes, bars and bar shapes.

**During the present critical shortage of nickel, an emergency manganese-copper-vanadium grade, identified as U·S·S TRI-TEN "E" steel is being produced in place of U·S·S TRI-TEN steel. It has equivalent engineering values and its use is recommended in place of U·S·S TRI-TEN steel.*

The bottom and sides of this drag conveyor and "take up", made by McNally-Pittsburg Manufacturing Corp., are of U·S·S A-R steel plates to resist wear and abrasion caused by thousands of tons of wet coal being moved from one deck to another in this coal processing plant. In applications such as this—and in picking tables, coal launders, loading hoppers, shakers, pick breakers and chutes—U·S·S A-R steel will give two to three times more wear than plain carbon steel.

U·S·S A-R STEEL

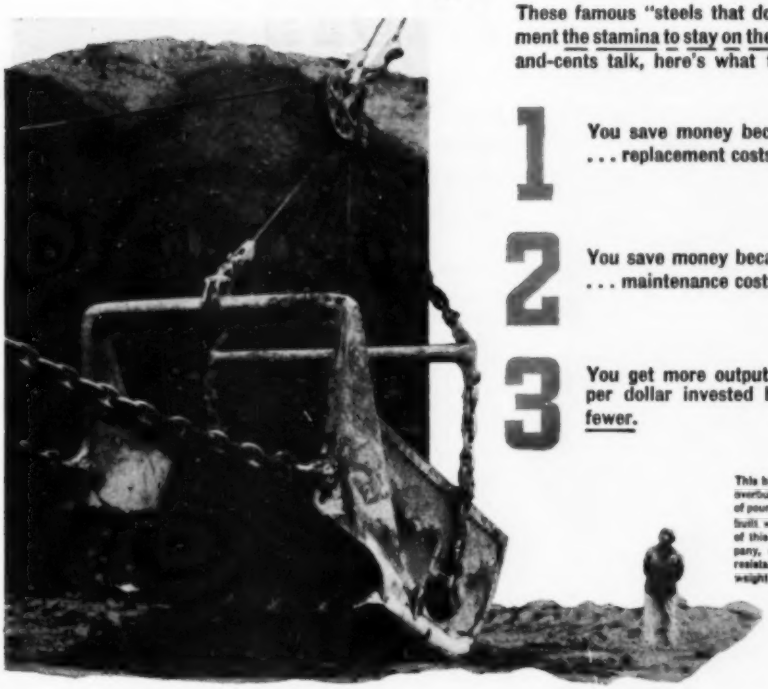
Here is a low-cost, abrasion resisting steel that was developed especially to meet the needs of the mining and other materials handling industries.

U·S·S A-R is an intermediate carbon-manganese steel, with better workability than plain carbon steel of the same hardness level. Its surface hardness ranges from 200 to 250 Brinell.

A-R steel has many applications in the mining field. Its use has decreased the number of breakdowns and lengthened the life of such equipment as chutes, buckets, conveyors, screens, picking tables, separators, loading booms, skid plates, etc.

U·S·S A-R steel is available in strip, sheets, universal mill plates, sheared plates and bars and bar shapes. It can be machined, drilled, sheared, punched, welded and hot and cold formed, although certain precautions and special equipment are sometimes necessary because of the product's exceptional hardness.

with U·S·S High Strength Steels



These famous "steels that do more" give your equipment the stamina to stay on the job. And in plain dollars-and-cents talk, here's what that means to you. . . .

1 You save money because equipment lasts longer . . . replacement costs are lower.

2 You save money because less servicing is needed . . . maintenance costs are lower.

3 You get more output (and therefore more profit) per dollar invested because work stoppages are fewer.

This big baby can scoop up 30 cubic yards of coal or overburden in one bite. That means it has to take a lot of pounding and grinding. And it can . . . because it was built with U·S·S TRI-TEN steel. The manufacturer of this king size dragline bucket, Bucyrus-Erie Company, chose TRI-TEN steel to obtain high impact resistance at low temperatures, high tensile strength, weight reduction and improved welding qualities.

WITH these famous high-strength steels; U·S·S CORTEN, U·S·S TRI-TEN, and U·S·S A-R, abrasion resisting steel, all parts ordinarily prone to fail can be made highly resistant to wear, fatigue, abrasion, atmospheric corrosion and shock. You get maximum strength and durability, and therefore maximum use from your equipment.

But that's not all!

U·S·S High Strength Steels have a yield point 50% higher than that of ordinary structural steel. That means you can increase the strength of parts *without increasing weight*. Or, you can use one of these steels in lighter sections to *reduce* weight without reducing your present level of strength. In either case, a substantial saving in steel may result.

For 17 years, our engineers have cooperated with the mining industry in applying U·S·S High Strength Steels. They'll be glad to show you how these tougher, stronger, more durable steels can be applied to give your equipment the stamina to stay on the job.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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U·S·S HIGH STRENGTH STEELS

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UNITED STATES STEEL

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you can plan your shots better when you "Hook up and Detonate with PRIMACORD"

Using Primacord you get faster, easier loading; the positive firing of every dynamite cartridge in every hole – be they wet or dry; the shooting of as many holes as you wish; the most efficient use of your men and mobile equipment regardless of the terrain or the weather. And correctly hooked up, you can shoot the front holes a split second ahead of those behind, giving you relief from burden and better fragmentation. All of which means easier digging, larger daily yardage.

Your men will like it, too. It's less hazardous – it cannot be set off by friction, sparks, ordinary shock or stray electrical currents . . . yet it fires instantaneously from a blasting cap.

***Plan your shots for bigger payloads with* PRIMACORD**

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THE ENSIGN-BICKFORD COMPANY
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There's a type for every job. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep holes and unusual wet conditions.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

DECEMBER, 1952

IVAN A. GIVEN, EDITOR

New Opportunity

A MOST WELCOME CHANCE to assay past policies and make necessary changes to better meet the problems of today and tomorrow is perhaps the outstanding result of the 1952 election. How fast the changes may come and how great they may be still is a question. In many respects the picture can be expected to remain largely as it is for a time—if for no other reason because the governmental machine is now so large and so cumbersome and past policies have now become so set that changes will be difficult and slow in many instances. But a new head has been chosen for the National government and the majority of the electorate have indicated their desire for a change in both policy and practice.

Perhaps our biggest immediate gain is a fresh viewpoint and an end to the confusion, frustration and concentration of doubtful policies and projects that has characterized at least the latter years of the present administration. There is now real hope for progress toward peace and for an administration more interested in ways to advance the Nation's interests rather than in keeping itself in power to plug its own pet ideas. Now, too, there is a new opportunity for the citizen to make himself heard in the Congress and elsewhere in the federal establishment. Manifestly, it is an opportunity that should not be missed.

Modern Siege

AT FIRST THOUGHT, one might consider that it would be necessary to go back to the Civil War to find the last example of a town under siege in the United States. But there have been a number since—practically all growing out of the organizing efforts of unions. The latest is Widen, W. Va., where the United Mine Workers, at the time of this writing, was still trying to literally starve the town's inhabitants into joining the union, punctuating its siege by dynamiting bridges and substations, blocking highways and perpetrating assorted acts of violence against persons and property. Such campaigns usually can be carried out only with the tacit if not direct consent of the local and state law-enforcement agencies. This is particularly true of the state in the Widen siege, though the local authorities must accept a large share of the blame for failure to live up to sworn duty. Even though condoned, violence and siege have no place in operations today, and if unions suddenly find themselves subject to sharp restrictions they need look no farther than their own tactics for a large part of the reason.

Big Step

THE MACHINE will never be the complete answer to all the coal industry's problems, though many of them would be greatly minimized if labor could be moved from the top of the list of mining costs down to or near the bottom. Coal would benefit not only from the reduction in over-all cost, with consequent strengthening of its competitive position, but also would have a much better opportunity to cope with the social, safety and other problems directly related to the employment of a large number of men. Failure to solve these problems, in fact, has been the biggest reason for past seizures and propaganda for nationalization.

Progress in the design and application of machines is accelerating and bringing the goal of minimum cost nearer every day. Now, we have underground mining from the surface, first with the big auger and now with the Carbide miner, featured elsewhere in this issue of *Coal Age* and regularly mining up to 690 ft by remote control. Machines like these and others that undoubtedly will be developed are truly laying the foundation for a bigger and better future.

Coal Stabilization . . .

Will-o'-the-Wisp or Real Help?

Many coal men agree: Coal must stabilize.

The thorny question is: How?

Artificial props? . . . More hurtful than helpful.

The only real answer? . . . Creative industry action.

DOES INSTABILITY THREATEN COAL AGAIN?

Storm warnings are flying, according to some quarters in the industry, and coal may be headed for trouble.

These are the signs some observers point to:

1. Weak prices—Bituminous now is selling below OPS ceilings, even after addition of 25 to 40c a ton following the recent wage rise.

2. Slender profits or none at all—Coal companies that aren't actually in the red are running on thin profit margins, with resultant weakening of capital strength.

3. Production—Tonnage-wise, as one observer puts it, "Coal is having to run like hell to stand still."

4. Competing fuels—Oil and gas are not losing strength, to put it mildly, and there's a threat of still more oil and gas to come from Canada.

5. The new contract—The wage scale, even as lopped off by the Wage Stabilization Board, is at a new peak and still well ahead of advances in productivity. The new seniority and leasing clauses may disrupt local labor relations and may cost more, in the end, than the dollar-and-cents increase.

6. Union leadership—Mr. Lewis, though still vigorous and still a winner, is aging. His retirement, which must come sooner or later, may be the signal for a union Donnybrook that would bring chaos to coal.

What Stability Is

Stability in coal is a condition of the industry and a state of mind as well.

Webster puts it pretty well. His dictionary says stability is "Strength to stand or endure without alteration of position or material change; steadiness or firmness of resolution, purpose or character." Applied to aircraft, he says (or to coal, for that matter), it means "That property of a body which causes it, when disturbed from a condition of equilibrium or steady motion, to develop forces or moments which tend to restore the body to its original condition."

Fitting Webster's definition to coal and the experience of coal men, stability can be said to exist in the industry under the following conditions:

1. When production is geared to market demand, with comfortable excess capacity to meet seasonal needs and adequate financial strength to ride with the ebb and flow of industrial activity.

2. When customers get a quality product, plus service, at a price that makes coal their preferred fuel.

3. When prices are rational and firm.

4. When profits average out over the years at a level that protects investment and makes it possible to improve properties when new mining methods emerge and to expand operations when markets call for more coal.

5. When opportunity exists for sound new enterprises to enter the industry and stay and for established enterprises to grow.

Under these conditions, there flourishes a state of mind among mine owners, mineworkers and customers that keeps coal moving confidently toward new horizons.

What Causes Instability?

HERE ARE THE CAUSES of instability in coal:

1. Overcapacity—Coal's history for the past quarter-century suggests that the industry can turn a fair profit when capacity, based on 280 days of work, does not exceed production by more than 30%. Above that figure, coal is likely to slip over into the red. Red figures that persist always bring instability.

The problem of overcapacity sometimes is made more acute by economically weak units in the industry. Some of them never grow strong enough to become responsible members of the industry when the going gets rough.

2. Prices of competing fuels—Oil producers can—and do—knock as much as 35c a barrel off the price of fuel oil—equal to about $1.50 on a ton of coal—and pipeline companies dump natural gas on industrial and utility markets in the summer months. These moves tempt big fuel users to switch to oil or gas. The result: Unsettled markets and more overcapacity.

3. Unrealistic wages—When wage rises outrun productivity increases, prices have to go up or profits have to be squeezed. Either way, instability moves in on coal.

4. Strikes—When customers can't get coal because a strike shuts off supplies, they turn elsewhere for fuel. Big users with multifuel boilers can make a fast switch. Householders move a little more slowly, but they move nevertheless. The result is attrition of coal's markets. Then, when production is restored, there's more overcapacity than ever.

5. Fear—There still are some coal operators who never have shaken off the fear psychology of by-gone years. For them, a competitor's price cut of 10c a ton is the signal for an answering 20c. A no-bill car on their tracks is an alarm bell. They offer it at a distress price to 10 buyers and thus give it the effect of 500 tons of distress coal. That's instability.

6. Cannibal economics—No company ever grew strong by living off depletion and depreciation—in other words, draining off capital assets to pay salaries and operating costs while selling coal for less than it costs to mine it. A company that turns to below-cost selling must measure its life expectancy by a shrinking yardstick. That, too, is instability.

Would It Help to Bust the Union?

PUTTING THE UNION OUT OF BUSINESS might appear, at first glance, to have some appeal as a step toward stabilization.

But the hard facts of history do not support this view. In addition to that, the union couldn't be busted now, anyhow. It's too strong, and it bids fair to stay strong provided Mr. Lewis' mantle of leadership falls on strong, wise shoulders when the time comes for a change.

If there are misgivings now about the merits of a union in coal mining, a quick backward glance at the chaos of the late 20's and early 30's will dissolve those doubts. The UMWA then was down to its last few thousand members and its last few thousand dollars. Miners' wages were fixed at the whim of operators and collapsed, along with prices, in response to any distress sale within 50 mi. Markets were in wild disorder much of the time.

The union, gathering strength in the middle and late 30's, didn't succeed 100% in bringing order out of chaos. But it did level out wages and thus dampen price fluctuations. This brought some stability to markets, so that an operator who won a customer stood a fair chance of keeping him.

Whenever the union has been an unstabilizing influence, an excess of zeal rather than a lack of it has been the reason. In an interview earlier this year with a French delegation, Mr. Lewis contended that his pressure on wages has kept operators humping to mechanize their mines. In some degree, he's right, though that hasn't been the only stimulus. Wage pressure applied realistically—that is, at the right time to spur modernization and productivity rather than dishearten the mine owners—has helped stabilize the industry in some measure at least.

But Mr. Lewis' pressure often has been more than the industry could bear without severe strains. The result has been long and disturbing strikes, loss of coal's price advantage over other fuels, the rapid spread of multifuel boilers, failure of coal companies to earn a fair profit for reinvestment in new machines and new properties and a growth in non-union tonnage. The wage rises Mr. Lewis has wrung from operators in the past two years, though achieved without costly strikes against the operators, are classic examples of putting the wage pressure on dangerously tight. Coal-company profits are down, markets are soft, some organizations have gone out of business altogether and non-union tonnage stands somewhat above 20% nation-wide and as high as 35 to 40% in some fields.

Is the Union Helping?

THE UNION COULD HELP the industry stabilize.

In fact, the union has as big a stake in stabilization as the operators have. In the recent wage conferences, the principals are said to have talked to this point, though no actual proposals were offered.

Among other things, Mr. Lewis from time to time has suggested a shorter work day or week, which might have some stabilizing influence. But during the recent wage negotiations, he denied publicly that at the recent wage talks he ever suggested or proposed a penalty wage for work on the fourth, fifth and sixth days. Those who know Mr. Lewis and work with him say he's too much an economic realist to offer such a proposal seriously. If he seeks stabilization, it will be by other means, they believe, and a shorter work week, if ever imposed, would be only a bridge to be used until something more workable could be found.

Some circles in the industry have suggested that the union take over price support. Under this plan, whenever prices broke below a fixed level the union, or the local on the scene, would call the miners out until the price level could be restored. As far as anti-trust laws are concerned, that would get by. Unions aren't subject to prosecution under those laws.

Such a plan would stabilize prices. But it's doubtful that the union would undertake it unless the social problems, arising out of instability and affecting the miners critically, should become acute. In those circumstances, the UMWA probably would move in on prices without being invited. But the industry and its workers aren't that bad off now, and it's not likely they will be in the predictable future.

The union doubtless looks on a rising wage scale as a stabilizing influence. If things always went as

The Executives' Forum . . .

Does Coal Need Stabilizing? . . .

"Normal Competition Best"

"Do not feel that any form of stabilization is desirable. I feel that normal competition is best for the public and best for the industry. The English coal industry has complete stabilization."

—Justin Potter, president, Crescent Coal Co., Nashville, Tenn.

"Industry Can Solve Problems"

"There is a definite and crying need for stabilization in the coal industry, both with respect to delivered costs and dependability of coal as a fuel.

"I do not favor any form of federal regulation either as to prices or production quotas. The industry, through its own efforts—assuming intelligent cooperation from labor—can undoubtedly solve most of its problems.

"Railroads must adopt a more realistic attitude with respect to freight rates. Coal is carrying far too heavy a burden as compared with other commodities and unless this handicap is removed, the coal industry cannot hope to improve or even maintain its present competitive position.

"It seems to me therefore that, first and most important, all segments of the industry must work more closely together.

"Second, labor must realize that only through increased productivity can the present scale of wages be maintained or improved and that the all-too-frequent interruptions in production, due to strikes, must be eliminated if the coal industry is to win back its reputation as a satisfactory and dependable source of supply.

"Third, the railroads must abandon their antiquated theory of rate-making and re-vamp their whole coal-rate structure."

—Hooper Love, president, West Kentucky Coal Co., Madisonville, Ky.

"Stabilize Selling Price"

"The best way to stabilize the coal industry today is to stabilize the selling price of our product.

"Coal is selling cheaper today than it was a year ago and it is the only commodity which I know that hasn't paralleled the other basic commodities of this country.

"If the bulk of the tonnage in the Southern high-volatile field would become members of Appalachian Coals, Inc.—a well-staffed and working organization which has met all the

planned, it would be. In time, it would drive wage costs up so high that only the efficient, low-cost mines could stay in business. That would cut capacity down effectively.

But things seldom go according to plan. Stabilization achieved through inflating wages and depressing production could backfire. Here's how:

1. Wage rises that are out of line with productivity increases drive prices up so high that a vacuum shows up in the fuel market. Competing fuels move into that vacuum. The result is that coal's markets shrink and the industry becomes unstable.

2. Competing fuels aren't the only aggressive enterprisers that move into the vacuum. Non-union coal producers also move in. Rather than stay idle, miners go to work for them. The result is instability for the union, which in turn means an element of instability in the industry.

Would An Annual Wage Do It?

A GUARANTEED ANNUAL WAGE looks like stabilization—from the miners' standpoint, that is.

But if a guaranteed annual wage were workable, which is doubtful, it would bring stabilization on only one side—the miners' side, and it might not last very long. Unless it lasted, it wouldn't be stabilization at all. And unless it helped the operators as well as the miners, it would fall short of its purpose.

Here's why a guaranteed annual wage doesn't look good as a stabilization plan:

1. It would burden the industry with one more fixed cost which, like other fixed costs, would not be geared to production or productivity.

2. In a good year, there's no need of it.

3. In a bad year, it would add to confusion. Scratching to mine enough coal to pay out on the annual wage, producers probably would glut the market, causing a price break that might make even a daily wage impossible.

4. Nobody except the government could guarantee an annual wage—and who wants the government in the picture?

The only possible solution—and even this is shadowed by doubts—is for operators voluntarily to reduce capacity to annual needs, schedule production at an even pace throughout the year and, in slack seasons, stockpile coal to take care of seasonal rises. A plateau of production, kept level throughout the year, might cut operating costs enough to offset the cost of stockpiling. But one problem still would remain: Who would guarantee seasonal markets lively enough to absorb the stockpile? Again, only the government could do that.

Would Tonnage Allocations Help?

IF OVER-PRODUCTION WEAKENS MARKETS, why not set up production quotas? In anthracite, a joint board of operators, mineworkers and state officials sets production goals every week. If quotas work for anthracite, why not for bituminous?

The fact that allocation works for anthracite doesn't mean it would work for bituminous. Here are some of the reasons:

1. Sheer size of the bituminous industry would be a real obstacle. Bituminous tonnage is over 10 times as big as anthracite.

2. Bituminous is produced in 28 states; anthracite, in a small area in a single state. Pennsylvania law sanctions the anthracite quota system. But persuading every state in which bituminous is mined to adopt a law sanc-

If So, How to Achieve the Goal?

tests as far as the government is concerned—it would do much to see that the producers sell their coal at a reasonable price with a fair return. Therefore my suggestion to you is that this is a way out for this industry."

—R. E. Salvati, president, Island Creek Coal Co., Huntington, W. Va.

"Abolish Controls"

"Abolish wage and price controls and restricting limitations on needed mine supplies and the coal industry will move forward as American industry has and should."

—R. L. Ireland, chairman executive committee, Pittsburgh Consolidation Coal Co., Cleveland.

"Forbid Industry-Wide Bargaining"

"The coal industry certainly needs stabilization but not through federal regulation.

"The power now concentrated in labor unions, unless curbed, will lead to nation-wide collapses of industry. The public interest demands that labor monopolies be terminated. The only way this can be accomplished is for the United States Congress to forbid industry-wide bargaining. Management is not opposed to labor unions as such. It is opposed to labor monopoly.

"Until such time as the employers may deal directly with their own employees through the employees' local union, periodic strikes will continue to occur, resulting in loss to the public, the employees and the employers. Given such an opportunity to negotiate directly with its local unions, the coal industry would go forward competitively strong, alert to its opportunities, and able to meet the fueling needs of the Nation, both in times of war and peace."

—P. L. Shields, president, Spring Canyon Coal Co., Salt Lake City, Utah.

"No Government Agency"

"There is unquestionably need for stabilization of coal, if you are putting the question in a general way. If you imply stabilization by government agency, I am emphatically not in favor of that."

—L. Ebersole Gaines, president, The New River Co., Mount Hope, W. Va.

tioning quotas would be an immense and probably impossible task.

3. Bituminous markets are scattered throughout the nation. Anthracite's market area is relatively small.

4. Quality and characteristics of anthracite vary only within narrow brackets. That simplifies allocation. But bituminous characteristics range all up and down the scale, with many coals having their own special uses.

5. Market research and forecasting, upon which allocations must be based, is far more complex for bituminous than for anthracite. With two-thirds of anthracite production used as domestic fuel, weather is the primary factor in marketing. But only one-sixth of bituminous output is domestic fuel, primarily affected by weather. The remaining five-sixths is industrial fuel, responsive not only to weather but also to depressions, strikes and the multifuel boiler. Market forecasting for bituminous, on a national or even regional basis, would be haphazard guesswork at best.

6. The Department of Justice doubtless would challenge a bituminous quota plan immediately. That's because any allocation agreement in bituminous would take on a magnitude that would invite challenge as a conspiracy in restraint of trade. The smaller size of the anthracite industry probably is one reason why the Department of Justice has left it alone.

In addition to difficulty and complexity, there are other factors that should bring pause to anyone who suggests a quota plan for the bituminous industry.

For example, how much tonnage does it take to make allocation work? In anthracite, it's about 94%. Would it take any less in bituminous? In how many bituminous producing districts could even 90% of the tonnage be brought under agreement? How much of it would stick when the going got rough?

Further, how many coal men would willingly submit to being told how much they may produce and how many days they may work their mines? That's what allocation comes down to, in the final analysis.

Most important, what happens to initiative and imagination under a quota system? Would it be a good trade to swap your chance for growth in return for assurance of a fixed share of an existing market? If the answer is "Yes," stabilization might be possible—but it would be stabilization downward, not upward.

Can Congress Stabilize Coal?

CONGRESS TRIED to stabilize coal in the 30's. It may try again. In fact, three bills now are being written and will be thrown in the legislative hopper when Congress reassembles.

By and large, these bills follow the pattern of the Guffey Acts of recent memory. They build a floor under prices, chalk out market zones and create a commission to administer the law.

A Guffey-style bill would draw support from some strange bedfellows. Here they are, and here are their arguments:

1. The Department of Defense—"If war comes, the military will draw off all the oil there is. Coal must move in to fill the vacuum. Hence a comfortable margin of excess coal-producing capacity is vital to national defense. If the coal industry can't finance excess capacity, the government must."

2. The apostles of nationalization—"Federal control is the cure for all ills—social, economic and industrial. Coal is among our prime targets."

3. Those coal producers who now are suffering most from slack markets—"We're headed into bad times. Non-union production is underselling us, competing fuels are taking our customers away and the country is

headed for a business slump. The government guarantees farmers a profit. Why not us?"

How much good the Guffey Act did —either the 1935 or the 1937 version— is an open question. Though it held some companies afloat that would have sunk without help, it did not put the industry on a profitable basis nor did it take the curse off overcapacity. Take a look at the figures for 1933, the year of the Blue Eagle, through the middle and late 30's, when the Guffey Acts ruled the industry, to 1940, when the growing war effort first showed up in coal.

Guffey Acts — No Cure for Coal

	Excess of Capacity Over Production (Per Cent)	Loss, Cents per Ton
1933	67.4	14.6
1934	57.4	3.0
1935	56.5	4.9
1936	40.8	3.6
1937	44.8	2.4
1938	72.5	9.1
1939	57.2	3.3
1940	38.6	0.9

If 8 yr of below-cost operation and crippling overcapacity was stabilization, it was not the kind of stabilization coal operators would like to see again.

In return for the Guffey Acts, what did the industry get? It got these things:

1. **A marketing straitjacket** from which some companies never have fully escaped.

2. **A price floor** that kept marginal producers in business but deprived the enterprising, progressive producer of the competitive advantage that rightfully was his.

3. **A damper on initiative** and a dulling of the fine edge of competition in the markeplace.

4. **Government intrusion** into privately owned business.

Would a Guffey-style law in 1953 bring benefits that the Guffey Acts of the 30's failed to bring? It's doubtful, to say the least.

There's some feeling in the industry that if there must be a Guffey-style act, it should be a fuels act, not a coal act. That is, it should control oil and gas as well as coal.

But a fuels-control act would be even harder to write and administer than a coal act. Presumably, a fuels act would attempt to specify the uses for which the various fuels might be burned, how much of each should be produced and where it should be marketed and at what prices. Straight off, the bill-writers would have puzzles. Suppose they decide there's to be no more oil for steam-raising. What is steam-raising? Where can they draw the line? Suppose they decide there's to be no more coal for domestic use. Then what is a residence? Is it an apartment? Or a house? Or a hotel? Suppose they rule, "More gasoline from crude oil." How much more? From what kinds of crude? These questions are only starters. Other questions and problems would go on from there.

What About Licensing New Mines?

A LICENSING PLAN for new mines, to be administered by the government, has been suggested in some circles as a cure for the curse of overcapacity.

Licensing might stop one thing: the influx of strangers, few of whom really are coal men and some of whom never gather the strength to stick with the industry as a constructive element.

But would the gains from licensing be worth the price?

Here's what licensing would cost:

1. **It would make a public utility of coal.** To open a new mine, a company would have to petition some government agency for a certificate of public necessity or convenience beforehand.

2. **It would slow down the replacement** of worked-out mines with new and more efficient operations, thus leveling off the industry on a plateau of mediocrity.

3. **It would shut off the flow of new** blood into the industry and result in inbreeding and stagnation.

4. **It would reduce growth opportunities** to companies already in the coal business.

5. **It would scuttle free enterprise** and surrender coal to the government.

Stabilization by Default?

COAL MEN WHO HOPE for stabilization of coal by default of oil and natural gas are whistling down the wind—for the next several years, anyway.

Here are the reasons:

1. Reserves of competitive fuels are growing bigger every year and the end of growth is not in sight. The end won't come into view as long as new fields like those in the Williston Basin and Canada keep coming in.

2. Though lots of responsible people, oil and gas men included, see coal as the Nation's basic energy resource for the future, few of them will predict a date when coal must shoulder the major burden. Those who will predict a date don't agree among themselves on what the date will be. It could come tomorrow if war broke out. But it just as well could be 10 or 20 or 50 yr from now. That would be a long wait. Coal can't stabilize on that kind of prediction.

3. Default of oil and gas would not guarantee stability for coal. If past history is any indication, rosy prospects would lure new companies into the coal business. The result might be as much overcapacity as before. That would be no solution for instability.

Since outside help is no good . . .

What Can Coal Do?

STABILIZATION, in the end, comes down to this: The industry must chart and steer its own course. Nothing else will work satisfactorily, to the best interest of all—coal men, workers, customers and the Nation.

Here are some of the steps coal men, individually and collectively, can take:

1. **Concentration of market research and sales effort**—Appalachian Coals, Inc., and Fairmont Coal Bureau are the star examples of integrated market research and product promotion for coal in existence today. More agencies like these would help gear production to market needs and ensure fair prices.

Another trend now shaping up brings some of the smaller coal-producing companies under the sales umbrella of big companies. This puts the market-research and sales skills

of large organizations at the service of small producers who could not pay the cost of their own research and sales staff. Production goals thus are integrated, customer services are improved and prices generally are held firm.

2. Merger and consolidation—Historically, coal is an industry of small independent enterprises. In many ways, that's good. But in other respects it has compounded confusion, especially in times of slack markets.

The historical pattern now is changing slowly. This may be the time to speed the change. In 1946, companies producing over 1,000,000 tons a year mined 55.8% of total bituminous output; in 1951, 59.3%. Meanwhile, the share of companies producing from 100,000 to 1,000,000 tons dropped from 30.5 to 24.9%. Granted, not all of this shift can be traced to merger and consolidation. But some of it can. To cite only three examples in 1951, Sinclair Coal Co. acquired the properties of Northern Illinois Coal Corp., Truax-Traer Coal Co. took over Binkley Coal Co., and North American Coal Corp. bought Rail & River Coal Co.

Consolidations like those require strong leadership, fresh imagination, financial know-how and big money. But experience thus far points to good results, taking shape in improved productivity, integration of tonnage with markets, and sounder financial structure.

3. Industry-wide organization—The freshest idea to emerge recently proposes a coal institute that would merge the aims and skills of all elements in the industry—mine owners, operators' associations, shippers, union leaders and retailers. The institute would be non-partisan, having no bias except the advancement of coal.

For a starter, the institute probably would begin operations in areas of policy and activity in which there's the best chance for all elements to see eye to eye—safety, product promotion, statistics and public relations, to mention only a few. With programs launched in these areas, the institute then would seek to extend the common cause to other areas where united effort would pay biggest dividends. These would include such matters of industry and public interest as the friendly settlement of industry disputes over wages and contract interpretation, legislation, market research and forecasting, advertising, and evolution of a code of ethics to guide the industry in conducting all its affairs.

Supported by a tonnage levy or some other means, the institute would provide the industry with consolidated strength and a single voice to achieve its aims.

4. The Coal Service Corp.—Coal must span the gap between production and utilization. Best gap-spanner thus far suggested is an industry-sponsored corporation supported by operators and the union as well, if persuasion will bring the union in. The corporation would seek out needs for new-type mining and burning equipment, engineer and develop the indicated machines and equipment, manufacture them, advertise and sell them. Naturally, fuel-engineering service would be part of the plan. The corporation possibly would be financed by a stock issue. Once under way, it would run like any other business; that is, as a free-enterprise venture rendering a service and turning a fair profit.

5. Better contract administration—Local upheavals are a big factor in coal's instability. They upset the normal flow of coal to markets, cut operators' profits and often make bad labor relations worse. Most disputes arise because management and union men can't agree on what the master and district contracts mean. What's needed is a rewrite of the contract to weed out ambiguities, or agreement at high level, possibly in the industry-wide institute proposed above, on the meaning of disputed contract clauses.

The truth is, contract-administration costs run high, in dollars and energy, for operators and the union alike. It should be possible to bring the light of reason to bear on areas of disagreement. When both sides take that approach, they will serve the best interests of the Nation, and their own best interests as well.

6. Mine modernization—To stay even in the coal business, to say nothing of getting ahead, requires continuing search for and use of the best and newest methods of mining and preparing coal. That's the only way to achieve low cost, high efficiency and superior quality, the final answer to coal's competitive strength and stability in the fuels market.

7. Sound financial management—To keep properties modernized, attract investors and provide strength for survival in slack years, wise money management is essential.

It takes courage to hold the line when price-cutting threatens. But the only alternative is to live on depletion and depreciation and that, as many operators found to their sorrow in the 30's, spells ruin.

Holding the price line is necessary, but there's more needed, too. Sound financial management means abandonment of old mines that can't be made to show a profit, renovation and remodeling of old mines than can be made to pay, investment in new properties, relentless scouting for new ways to cut labor and other costs, and conscientious plow-back of profits into dollar reserves.

8. Advance planning—It's not enough to take each day or year as it comes. To stay in business and prosper, coal men must look ahead. Among other questions, here are a few that must be kept under review year after year:

Who will be coal's customers next year? Five years from now? Ten years hence?

How much coal will they need? What kinds?

What must I do to my coal to make it a useful product to future buyers?

How can I finance improvements? What do I need to mine coal more efficiently?

How can I keep my company strong enough to survive backsets, hold old customers and win new ones?

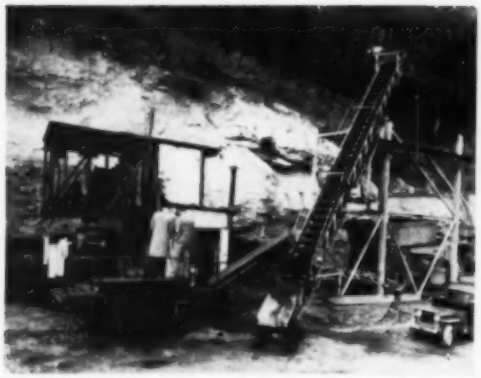
The answers to these questions will change from year to year but the operators who keep looking ahead down these lines always will be prepared for the worst—and the best.

. . . And Finally

THE BEST STABILIZATION in coal mining, after all's said and done, is dynamism—moving forward to new levels of service that bring new levels of prosperity.

The artificial profit, the protected market and the other will-o'-the-wisp benefits of the kind of stabilization that sometimes seems most appealing bring also the hazards of (1) surrender of industry independence to outside authorities and (2) stultification of progress through destroying incentive.

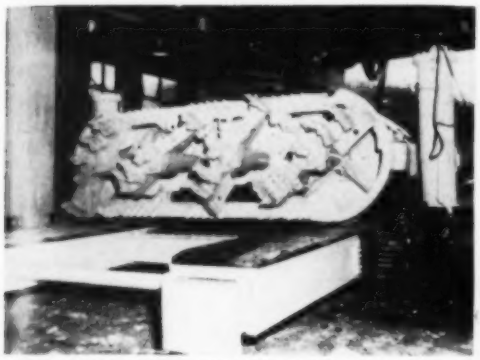
Stability of the right type is not the product of an artificially created market or profit. Rather, it is the product of efficiency in production, sales and service, thus providing the customer with the maximum of benefits for the minimum of cost—in other words, dyamism rather than protection. And when everything else is said and done, it means refusal to sell unless there's a fair profit in the sale.



THE MINING RIG (left) provides means of launching the mining unit and includes service and control equipment. Coal is fed to an elevating conveyor which carries it up to a truck-loading hopper (right).

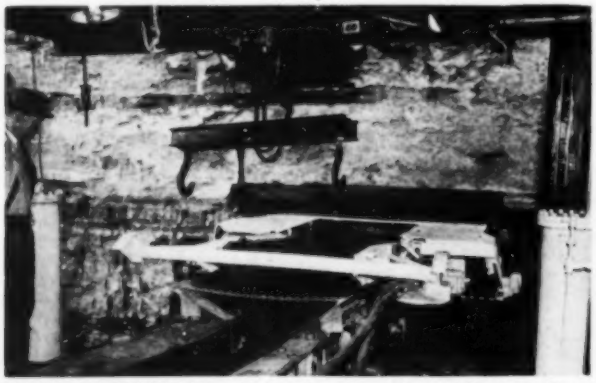
PREPARATION FOR MINING involves facing up the coal with shovel and bulldozer and constructing a bench with a minimum width of 35 ft for haulage and as a working platform for the mining rig.

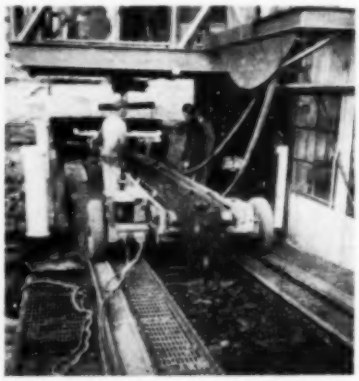
"Sunshine Mining" by pushbutton control on the surface.



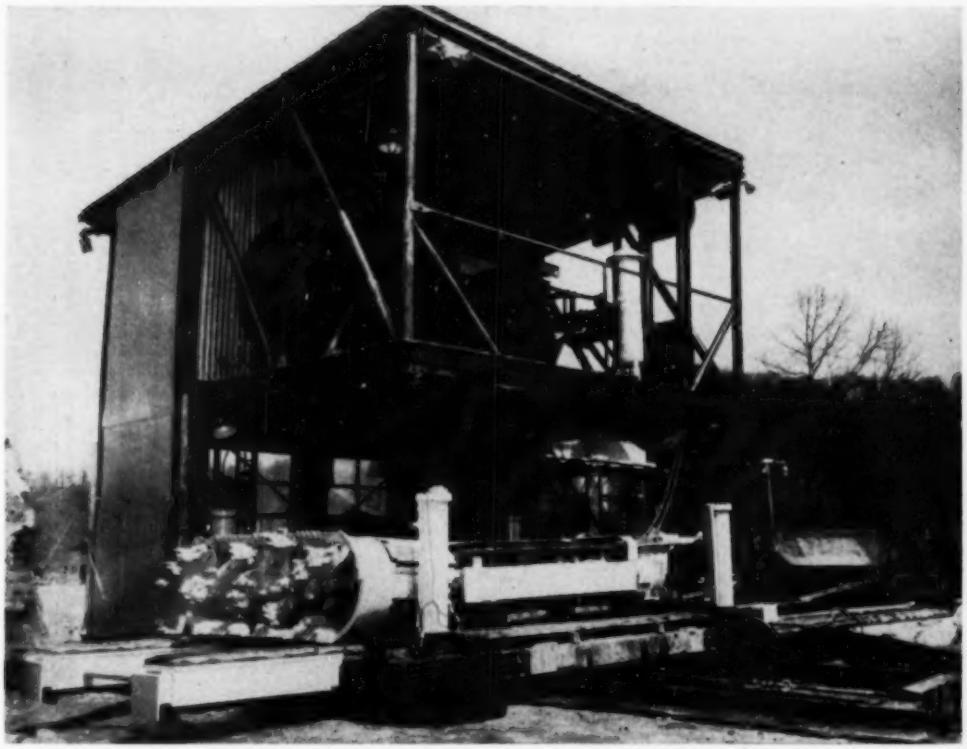
FOUR OVERLAPPING CUTTING HEADS and bulldozer blades at the top and bottom constitute the "business end" of the miner. Paddles behind the outer heads kick the coal to the center conveyor.

MINING RESULTS—a cut 38 in high and 9 ft 8 in wide producing 1.2 tons per foot. Maximum rate of advance is 30 in per minute; usual rate is 18 to 20 in per minute in the coal being mined, which is hard and blocky.





PORTABLE CONVEYORS pulled by the miner bring out the coal. The chain block and cradle (left) can be used to suspend the feed end of the next conveyor in the line until the time comes for coupling it on.



NO MEN UNDERGROUND—resting on the launching platform ready for the next trip into the hill, the Carbide miner has bored 690 ft in from the outcrop and can go even farther with additional conveying equipment. Reels on the second floor of the mining rig accommodate 1,000 ft of power and control cable.

Underground Mining From the Surface With . . .

The Carbide Miner

Mining 690 ft from the outcrop without a man going underground.

A potential range of 1,000 ft or more.

A maximum production to date of 567 tons in one 8-hr shift.

A maximum production of 1,240 tons in one continuous 24-hr day.

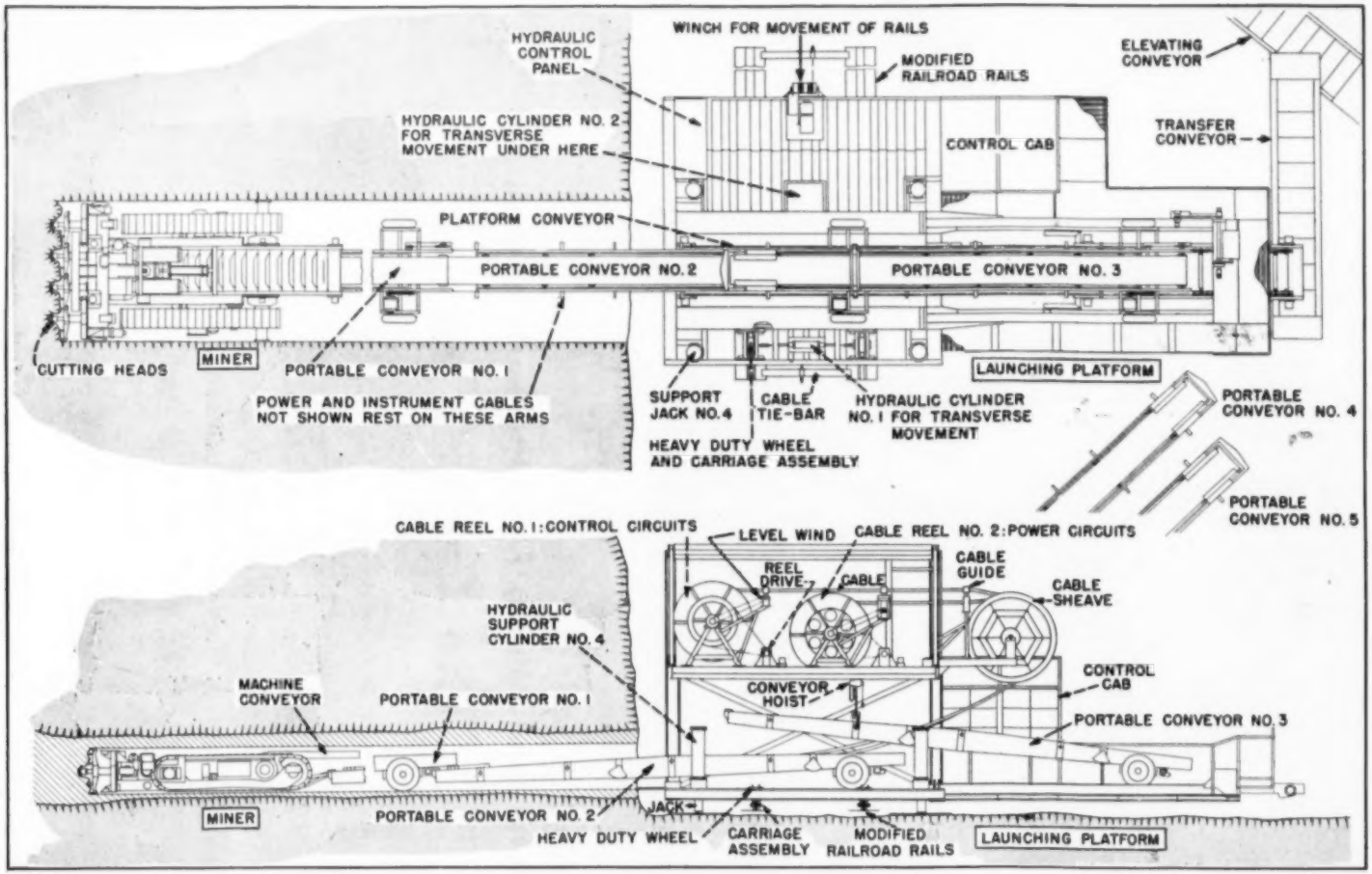
A maximum production of 6,000 tons in one 7-day week.

A recovery of 65% of the coal within reach of the machine.

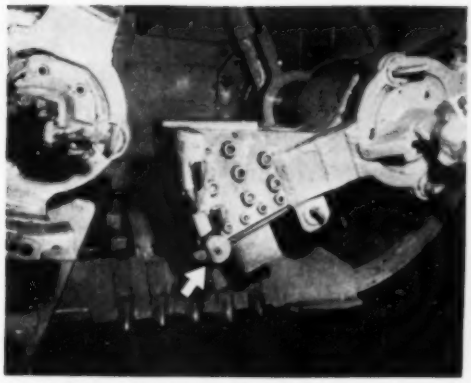
A total of 37 men per week on the payroll, including direct supervision.

THESE ARE SOME of the results achieved with a remotely controlled continuous miner and continuous-mining system developed by the Carbide & Carbon Chemicals Co. at its Blue Creek project, near Quick, in the Kanawha Field of West Virginia.

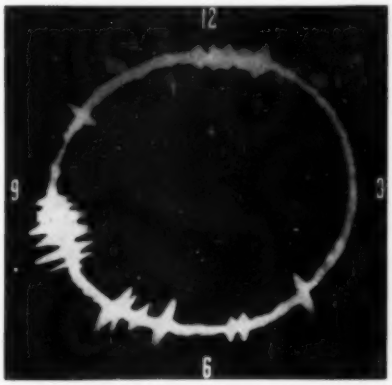
Development of the machine and mining system was the outgrowth of the organization of the "Physical Processes Group" in the spring of 1946. The present machine is the third in the line—all remotely controlled to some degree. It went into operation in October, 1950, and to the end of



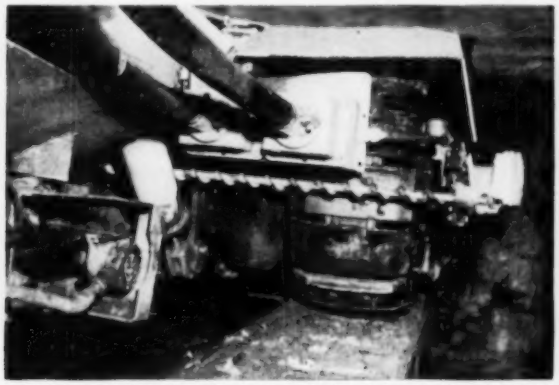
SALIENT FEATURES OF THE CARBIDE MINER. The mining rig (right) serves as a launching platform for the miner (left), which feeds to a series of portable conveyors. The upper deck of the mining rig includes reels for 1,000 ft of power and control cable, which is fed out over the sheave at the rear.



CONTROLLING VERTICAL DIRECTION—"stratascopes" (arrow) on each of the outside cutting heads show "blips" on oscilloscope screens in the control cab (right). The blips indicate material harder than coal, such as, top, bottom or bony streaks in the seam.



OSCILLOGRAM shows blips at approximately 8 o'clock corresponding to bony band, which normally is used for vertical steering rather than waiting for machine to strike top or bottom. If the blips move either direction it indicates that the machine is heading up or down, permitting correction by raising or lowering the head.



SIDEWISE DRIFT is indicated by boring through rib with drill, which automatically reverses when it breaks through. Distance is indicated by a dial in the control cab and if rib thickness is more or less than the standard, correction is applied by steering shoes at the front end of the miner providing a maximum of ⅝ in of deflection either way. This deflection, if fully used, provides a rather sharp change in course.

November, 1952, had mined approximately 150,000 tons. Experimentation is still going on, with construction of a fourth and still more improved unit scheduled for the relatively near future.

The men behind the machine, none of whom had had previous coal-mining experience, include the following:

Dr. G. T. Felbeck, vice-president, Carbide & Carbon Chemicals Co.

P. L. Alspaugh, superintendent, physical processes department.

J. W. Heimaster, head of mining operations and design of mining machinery.

R. L. McNeill, assistant head of mining operations and machine design.

T. H. Rafferty, C. E. Strick, R. R. Cosner, J. D. Newlon and J. R. Reid, design engineers.

In addition to the preceding, actual operation is supervised by:

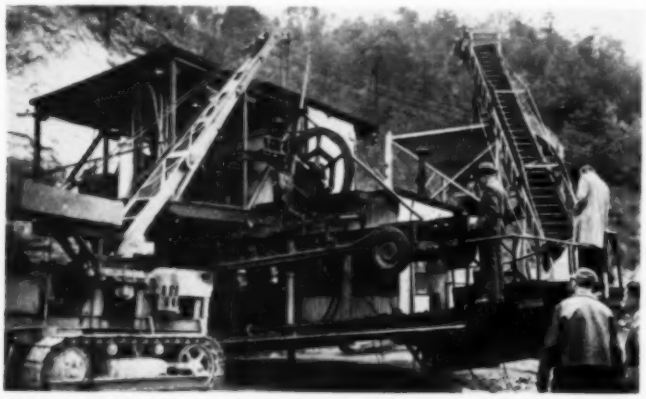
J. H. Hansford, mine superintendent.

M. L. Brown, assistant mine superintendent.

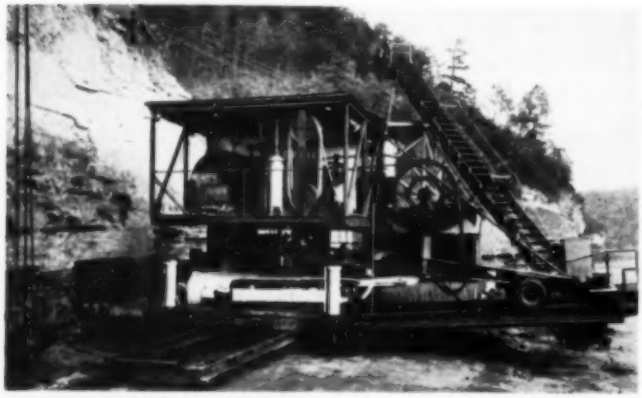
The Carbide miner was designed for mining from the outcrop. It is presently recovering the No. 5 Block coal in hilltops in the Blue Creek region. Thickness of the seam ranges from 48 to 54 in, and the coal is hard and blocky in nature. The bottom is 4 to 5 ft of fireclay, which softens when wet. The immediate top usually is 2 to 4 in of shale, followed by 2 in of coal and then sandstone. A fairly persistent bony layer about 4 in thick occurs about the middle of the seam and normally is used as the reference point in positioning the miner as it advances.

Preparation for mining consists of opening up the outcrop with a shovel and bulldozer. The aim in this is to face up the seam and establish a bench approximately 35 ft wide, minimum, on which a road for truck haulage is built, using crushed native rock. This road also serves as the working platform for the mining rig. Belt conveyors rather than trucks were

PORTABLE CONVEYORS are stacked on the bench until time for inserting them in the line. Each conveyor is 30 ft long and is driven by a 3-hp motor.



MOBILE CRANE brings up new conveyor and lowers it to the launching platform for use in making another 30-ft advance. The same crane removes the conveyors in retracting when the hole is completed.



JACKS SUPPORT THE MINING RIG at the proper height for coal production. The rails underneath the rig can be run out, dropped to the ground and the machine moved over on them to the next hole by a winch and cable. A portable conveyor is shown suspended over the miner ready for use when it is far enough in the hill.

employed for transportation in the early days of the experiment, but because of the winding nature of the highwall the runs were short and the numerous drives complicated power supply and maintenance. In addition, weather was more troublesome.

The Mining Rig

All equipment was designed by Carbide personnel. The mining unit was built by the company. Certain other equipment, including the conveyors bringing out the coal, was built outside to Carbide designs.

The mining rig is a self-propelled double-deck structure. On the lower deck is a runway or launching platform for the mining machine. This deck also is provided with a chain-and-flight conveyor receiving coal from the conveyors serving the miner and feeding to a transfer conveyor at the rear end. This transfer conveyor discharges to an elevating conveyor placing the coal in a 20-ton elevated bin for loading the 20-ton haulage units. At present, this bin is mounted on skids and is pushed by backing the truck against a bumper structure. It will be redesigned with a crawler mounting to make it self-propelling.

The lower deck also includes a control center for moving the entire rig, as well as a separate control center for the mining machine. The top deck includes the electric switch gear and the cable reels for the power and control cables for the mining machine.

The entire structure is mounted on four hydraulic jacks, which can be adjusted so that the launching platform is at the proper height for the mining unit to enter the seam. To move the rig, the jacks are raised to permit rails suspended from the undercarriage to be rolled out by an electrically driven winch. The jacks then are let down until the rails rest on the ground and the winch pulls the rig over on wheels running on the rails. The rails can be pivoted to permit changing direction to follow the curves of the outcrop. When the platform is in position, the hydraulic jacks are raised to support the rig at the proper height for mining. Incidentally, the location and direction of each hole is spotted by the highwall foreman, using an instrument. Normally, a rib 3 ft thick is left between successive holes.

The Mining Machine

The Carbide miner is mounted on crawlers driven by a variable-speed motor when actually mining. The "business end" consists of four overlapping cutting heads tipped with

MEN BEHIND THE CARBIDE MINER—Dr. G. T. Felbeck, vice president, Carbide & Carbon Chemicals Co.; P. L. Alspaugh, superintendent physical processes department; J. W. Heimaster, head of mining operations and design of mining machinery; R. L. McNeill, assistant; T. H. Rafferty and C. E. Strick, design engineers; J. H. Hansford, mine superintendent; M. L. Brown, assistant. R. R. Cosnar, J. D. Newlon and J. R. Reid, additional design engineers, were not present when the photograph was made.

tungsten-carbide bits. Each head has a center pilot head using finger-type bits. The coal between the holes made by the heads is broken out by bulldozer blades on the top and bottom. The top blade can be dropped 2 in to facilitate moving the unit back out of the hole.

Size of the hole made by the four heads is 38 in high and 9 ft 8 in wide, rounded at each end. By making one or more cuts below the first, the entire seam can be mined. Normal practice at Blue Creek is to make a second cut. In spite of the fact that it is not a full cut, production per minute is almost as great because the machine can advance faster.

Paddles attached to the shafts behind the outer cutting heads kick the coal to the center, where it is picked up by a 40-in chain conveyor and carried back to the rear of the machine. On the present unit, the throat is 4⅝ in, which limits top size to approximately 4 in. If larger lumps hang up, the conveyor can be reversed to kick them back to the face where the cutting heads can break them up. From the bulldozer blades back, the cutting end is encased in a metal jacket so that the coal can escape only via the conveyor. Clearance over the shoes at the sides is approximately ⅛ in at the front and ¼ in at the back. The top bulldozer blade, as noted, can be dropped 2 in to provide for the crawler running up on pieces of coal during retraction. Otherwise, no special provision for retracting the machine is necessary under normal conditions.

About the only difficulty encountered in bringing the machine out of the hole is miring down where water softens the fireclay bottom. When that happens, the string of conveyors is used to pull the machine back. For the present, the bulldozer used in face preparation is employed, but a 6-ft jack will be installed at the back of the launching platform to simplify the operation. Heavy falls on the machine or the conveyors would require hand work for their removal, but none have yet been encountered and it is felt that with any but the worst top they would be a rare occurrence in view of the speed of extraction and the fact that the top is not disturbed or subjected to shock.

Powering the Machine

In addition to mining the coal, the Carbide miner also pulls the conveyors after it moves into the hole and pushes them back out when the hole is completed. Power for moving the machine into the coal is provided by a specially-built 7½-hp DC motor, supplied by an m-g set on the top floor of the mining rig. Speed of advance can be varied from zero to 30 in per minute by varying the field voltage of the DC generator. Usually, the speed of advance is 18 to 20 in per minute, with each foot of advance yielding 1.2 tons of coal. Tramming in retraction and launching at speeds up to 30 fpm is provided by a 20-hp AC motor. Other motors, all 440-v AC, are as follows:

Two head motors, 60 hp each. Speed of the heads is 60 rpm.

One conveyor motor, 7½ hp.

One hydraulic pump motor, ½ hp, used for certain jacks.

One guide-shoe adjustment motor, ⅓ hp.

One spiral-correction motor, ⅓ hp.

One rib-thickness drill motor, 2 hp.

In addition to the motors on the mining machine, other equipment is powered as follows:

Twenty-two service conveyors, 3 hp each.

Platform conveyor, 5 hp.

Transfer conveyor, 3 hp.

Elevating conveyor to hopper, 7½ hp.

With the miner and all conveyors in operation, demand averages 200 kw.

Weight of the miner is 20 tons. Over-all length is 22 ft. Weight of the mining rig with miner on the platform is 60 tons. The crawlers on the miner can develop a pull of 29,000 lb on a good, solid, dry floor. Average load when traveling at 12 to 15 in per minute, is 12,000 to 13,000 lb, including 2,000 lb for the service conveyors when all 22 are in the line.

Steering the Miner

Since the Carbide miner is not accompanied by an operator, steering it over its 700 to 1,000 ft or more of travel required developing a battery of indicating and control instruments and equipment. Including the footage counter, the total number of instruments is 20. One cable carrying 14 conductors is used for power. Hydraulically powered reels with spooling devices are used to reel in, pay out and store the cables. The capacity of each reel is 1,000 ft on the present machine.

Vertical positioning in the seam is indicated by "stratascopes," or electric

sensing devices. Two are employed—one on the outermost cutting tooth of each outside cutting head. The stratascopes are coupled to two polar oscilloscopes in the control cab. Each oscilloscope has a circular screen and the path cut by each sensitive tooth is registered as a circle on the screens. When the stratascope teeth cut through anything harder than coal, irregularities, or "blips," appear in the light circles on the screens. Thus, for example, a bony band shows as blips on one part of the circle, and if they move either direction it normally indicates that the machine is moving up or down and thus permits the operator to correct the direction as necessary. Correction is applied by actuating a hydraulic jack to raise or lower the head, which is pivoted on the main body of the miner. A change of as much as 1 in in climb or drop in 1 ft is possible.

Drift from one side to the other is caused by faulty direction, by worn bits on one side or the other, by a change in the character of the coal, and so on. A light beam can be employed for checking but the major reliance is placed on a drill at the rear of the machine on the side next to the rib. Every 30 ft, when a new conveyor is added, the drill is started up to bore through the rib. The drill reverses automatically as soon as it breaks through and the length it goes is registered on a dial in the control cab. If drifting is occurring, the guide shoes on the side at the front of the machine are energized to correct direction by pushing against the side of the hole. The maximum push is ⅝ in, which, if used to the full, provides a rather sharp change in course.

"Spiralling" also must be corrected for when it occurs. It can result from a piece of coal under the track lifting one side of the machine. Dials in the control cab also show this action, and correction is made by raising or lowering the head on one side by moving the bearing and shaft up and down in the ways in which the bearing is mounted.

Transporting the Coal

Transportation behind the Carbide miner is handled by a series of portable conveyors. These are two-wheeled units with rubber tires and equipped with 24-in belts. Each conveyor is 30 ft long and weighs approximately 4,000 lb. As previously noted, each one is driven by a 3-hp motor, with plug-equipped power cables in conduit on one side. Power and control cables for the miner are carried in L-shaped books on the opposite side.

In starting a new hole, the mining rig is moved over and the height and angle are adjusted. If the launching platform does not reach the coal face, the gap is bridged by extending telescoped sections of the runway. The miner is then moved forward and started into the coal. When the machine is almost underground, the rear of the conveyor reaches the end of the platform conveyor. At this point, the machine is stopped and the first portable conveyor, the receiving end of which has been lifted by a chain hoist on a monorail mounted under the top deck, is lowered and coupled to the miner. When it is pulled in 30 ft, a crawler-mounted crane can lower another, picked up from storage on the ground, onto the platform for coupling up. As an alternative, the new section can be placed on the runway with the receiving end held up by the chain hoist until it is needed. This is the usual practice. This process is repeated until all the conveyors are installed in the train or the hole reaches its desired depth.

The conveyors, as noted, are pulled ahead by the miner. Gage of the wheels is 78 in, or the distance across the bottom of the hole to the point where the circle on each side begins. This facilitates tracking.

When the hole is completed, the motors are reversed and the miner pushes the train of conveyors out of the hole. Only occasionally, as previously noted, is it necessary to pull conveyors from the outside. When all the conveyors are out and detached, the machine itself backs out onto the platform, after which the second cut is made in the bottom. Then, the rig is moved to the location of the next hole. Backing, as noted, can be done at 30 fpm.

On inside and outside curves, the holes may be fanned out or a series of variable-length ones drilled, depending upon conditions.

A portable conveyor has been added to the line in as little as 30 sec. The entire mining rig has been moved to the next hole in 15 min, but normally 30 min is allotted to the move to permit checking oil and machine condition.

Manpower Requirements

Maximum depth of holes presently is 690 ft, which is the limit with the conveyors now on hand. With additional conveyors, 1,000 ft or perhaps even 1,500 ft or more is considered entirely practicable. Leaving 3-ft ribs between holes and making second cuts in each where practicable, recovery is approximately 65%. Maximum production ranges up to 1⅔ tpm, and the coal has a nominal top size of 4 in, with approximately 40% less than ¼ in in size.

For productions up to 567 tons per shift, 1,240 tons per day and 6,000 tons per week, the total number of men on the payroll is 37. Since the project is still experimental in nature, this is considered somewhat higher than would be required for a production setup.

The operating crew per shift is four—control man, crane operator, truck driver and shift leader. Since the time per man is 40 hr per week while operation is continuous over 7 days, a total of four such crews, or 16 men, are employed. The remainder of the 37 men is made up as follows: electrician, helper, welder, helper, carpenter, helper, shovel operator, bulldozer operator on highwall, bulldozer operator on storage pile, three mechanics, two men clearing and shooting face, supply-truck driver, janitor, superintendent, assistant superintendent, face foreman (highwall), maintenance foreman and timekeeper-clerk.

Only two lost-time injuries have been incurred since the project started, and these were not connected with the actual mining operation.

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Quick Comeback—Legal Division

An attorney was having trouble with a witness—an old man who was taking a dim view of his efforts.

"Are you acquainted with any of the jurymen?" he asked.

"More than half," the old man grunted.

"Are you willing to swear that you know more than half of them?"

The old man surveyed the twelve good men and true.

"If it comes to that," he drawled, "I'm willing to swear I know more than all of them put together."

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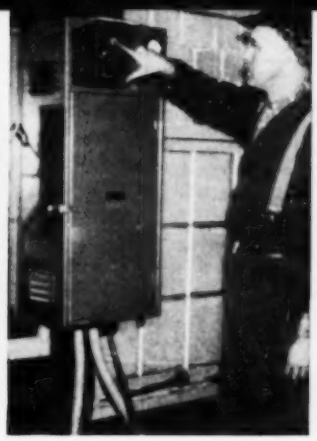

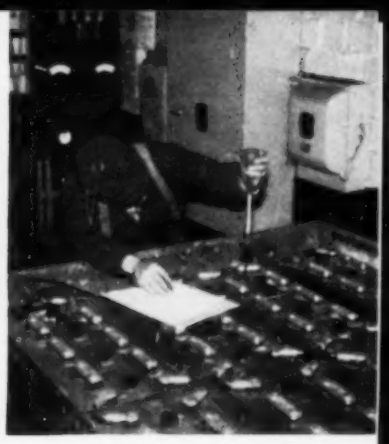

CHARGING IS AUTOMATIC INSERT charging plug into battery . . . Press automatic control . . . Test one check cell every week.

MAINTENANCE IS EASY DON'T ignore your batteries . . . Or neglect them . . . Just treat them right.

Battery-Charging Simplified For Coal-Mine Service

Want better performance from your storage batteries? Let these experts show you how easy it is to charge your batteries properly . . . How little it takes to service and maintain them correctly . . . How to assure the service life you're entitled to.

By J. F. HENSLER and E. F. GROTHE, Field Engineers
The Electric Storage Battery Co., Philadelphia

THE PROBLEMS of charging and maintaining storage batteries used to power mine locomotives, shuttle cars or other "vehicles" have been reduced to a simple, easy task with the equipment now available.

The function of charging equipment is to replace the energy taken from a battery during its working hours. Whether battery charging is done by generators or rectifiers, such equipment should be: (1) appropriate in size electrically, i. e., volts and amperes; and (2) operated by automatic controls.

HOW A BATTERY OPERATES

Knowing what a battery is and how it operates may make it easier to understand the problems of battery charging.

In its simplest form, a storage bat-

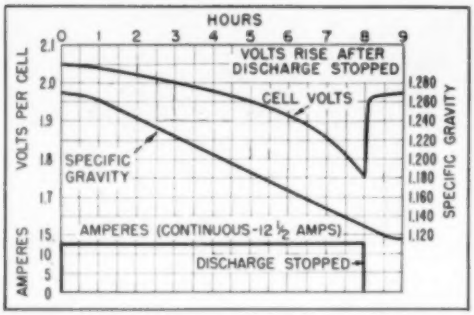

FIG. 1—WHAT HAPPENS when a 100-amp-hr battery cell discharges.

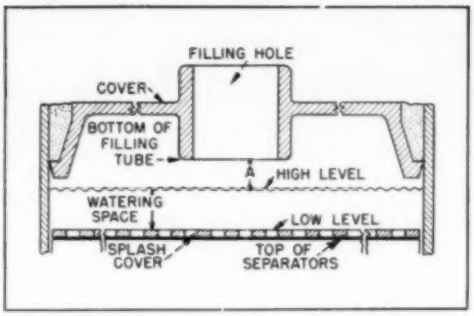

FIG. 2—CORRECT WATER LEVEL at the top of a battery cell is important.

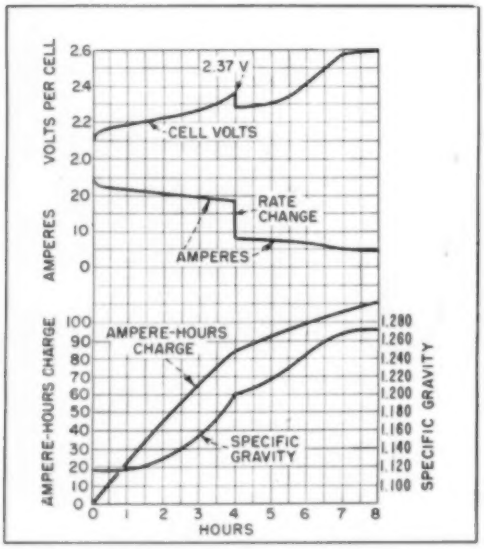

FIG. 3—"TWO-RATE" CHARGE of a 100-amp-hr battery cell, following discharge of 100% of capacity.

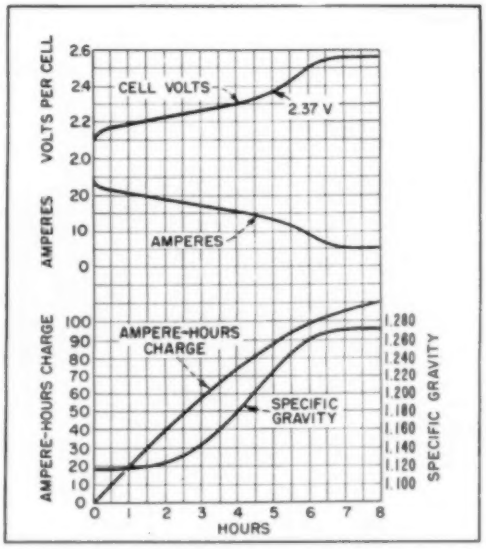

FIG. 4—"TAPER" CHARGE of a 100-amp-hr battery cell, following discharge of 100% of capacity.

tery consists of two plates of different metals immersed in a electrolyte. When the battery is connected to an electric circuit, pressure (voltage) is created by the plates. The electric pressure of each lead battery cell is approximately 2 v. Incidentally, the addition of plates to a cell only increases its capacity (amperes or ampere-hours). The pressure, 2v, remains the same.

DISCHARGE: Storage batteries do not "store" electricity. When a storage battery is discharging, current is produced by the action of sulphuric acid in the electrolyte combining chemically with (a) the lead peroxide of the positive plates and (b) the sponge lead of the negative plates. This action forms lead sulphate on each plate, lowering both the specific gravity of the electrolyte and the voltage of the cell (Fig. 1). With continued discharge, enough lead sulphate forms on both plates to make them act alike (or like similar metals), which in turn causes the current to stop flowing.

Batteries of the lead-acid type can be discharged at very high rates, with their only limit the ability of motors and wires to handle the current. It is this operating characteristic that makes storage batteries an ideal power source for electric vehicles, because their power demands consist of a series of demands for high peak power for short intervals, brought about by frequent starting and stopping. Whether a lead battery is intermittently discharged at high (peak) or low rates makes no difference in its life.

CHARGE: In charging a battery, direct current must be sent through the cell in a direction opposite the current flow during discharge. (See Secs. I and II for the methods of determining voltage and ampere-capacity requirements of your charging equipment.)

The charging current reconverts the lead sulphate to lead peroxide and sponge lead by driving the acid out of the plates back into the electrolyte. Gradually all acid absorbed by plates during discharge is returned to the electrolyte. During the early part of a charge, large quantities of direct

current can be utilized. That, incidentally, is why it is permissible under certain conditions for a local serviceman to give your automobile battery a so-called "fast charge," which, however, is never a full charge.

As the battery charge nears completion, there is not much acid left in the plates and consequently a lower rate can and should be used toward the end of the charge. At this point, any excess current will be wasted in decomposing the water in the electrolyte by electrolysis. Wastage of excess charging current is indicated by gassing (which resembles boiling) of the electrolyte. (For an explanation of two types of charging, see Sec. III.)

A mild degree of gassing toward the end of a charge is desirable. However, gassing at any other time should be avoided, since it is prolonged or violent gassing that causes extra wear on the plates and thus shortens battery life.

SIMPLIFIED CHARGING

At the end of the working period, the battery should be put on charge. This is easily done by disconnecting the "running plug" from the battery receptacle and placing the charging plug into it. Control switches or panel buttons, using AC for timing devices, permit the motorman or charging-room attendant to start the charge easily. Where AC is not available, an ampere-hour meter mounted on the charging panel is preset before each charge by the attendant, after taking a hydrometer reading of one cell and consulting a posted chart that indicates the setting of the meter dial corresponding to the quantity of discharge shown by the hydrometer.

At the end of the charge, the battery is automatically disconnected by the control equipment. End-of-charge is indicated by a zero reading of the ammeter on the control panel, lighting of signal lamps or by the positions of other switches.

THE EQUALIZING CHARGE

Once a week it is desirable to give all batteries an "equalizing charge," which consists of an additional charge of 3 or 4 hr at the battery's finishing rate.

Where the AC timing devices are used, the equalizing charge is provided by putting the battery back on charge after it has been recharged, with the automatic controls stopping the charge as with a regular charge. Where an ampere-hour meter on the panel is employed because AC is not available, it should be set for an additional charge of 25% of the battery ampere-hour rating. The equalizing charge, which will also be automatically terminated, should be given after the normal charging.

Purpose of an equalizing charge is to make sure that the battery is fully charged. That fact should be confirmed after completion by taking and recording a hydrometer reading of one cell.

OTHER BATTERY MAINTENANCE

All you need to do for a battery, besides charging it, is to add approved water once a week, and keep it clean and dry on top.

In adding water, do not fill cells too high. The maximum water level (Fig. 2) varies, depending on the cell type. A working rule of thumb is to fill to a level halfway between the bottom of the filling tube and the splash cover. The variation is a result of the fact that the taller cells require more air space for expansion and bubbling of the electrolyte when the cells are on charge.

The quality of local water generally makes it satisfactory for use; but, to be on the safe side, consult your battery manufacturer before adding such water. Water can be added quickly and conveniently with a cell filler designed to give a signal when maximum level is reached. The water flow then is shut off by a valve in the operator's hand.

The quantity of water used is a clue as to whether a battery is receiving too much or too little charge. In average operation, water should be required only once a week. If it is needed more frequently, too much charging is indicated.

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Ain't It the Truth!

There are many ways of doing things. Some people turn up their sleeves and work. Others turn up their noses.

Love-making hasn't changed in a thousand years. Greek maidens used to sit and listen to a lyre all evening, too.

What you learn after you know it all is what really counts.

Most great civilizations have fallen not through external aggression but through domestic corruption.

When an apple a day costs more than keeping the doctor away —that's inflation.—*Hot Stuff*, Cortright Coal Co.

KEEP BATTERIES CLEAN

Keeping the top of the battery clean and dry is not difficult.

For batteries in steel trays, each week blow loose dry dirt or bugdust off the top of the battery with low-pressure compressed air or hand bellows. Then wash the battery top with a solution of bicarbonate of soda (baking soda), mixing 1 lb of soda to 1 gal of water. Use a paint brush or scrub brush (non-metallic) to apply the soda solution. Then hose the battery with clear water.

For batteries in wood trays, each week blow off dirt as above, but generally washing the battery will be needed only at monthly intervals.

These cleaning requirements are necessary for coal-mine installations because wet coal dust or bugdust can conduct stray ground currents. For other types of mining where dirt, dust and moisture are less of a problem, or are non-existent, cleaning requirements can be liberalized.

Soda solution is used because any electrolyte spilled, or present in moist dirt on the battery, will not dry away or evaporate. It must be neutralized with the soda solution and rinsed off the battery with water. Then the parts will dry. Areas that do not dry should have a reapplication of the soda solution (which will bubble when electrolyte is present), followed by rinsing with water.

At all times, in cleaning, charging and using the battery, have the vent plugs tightly in place. Sometimes the vent plugs themselves need cleaning, which can be done by letting them stand in a bucket of clear water for about half an hour. Make sure that the small gas-escape holes do not become plugged with dirt.

When a charging location handles more than one or two batteries, the identity of the battery and the vehicle to which it is assigned should be a matter of record.

With shuttle-car batteries, since each 48-cell battery consists of two identical 24-cell trays, it is particularly important to always keep the two 24-cell trays paired throughout their entire service life—no matter whether they are on the car, on charge, or idle. Large markings on the trays, such as 1A and 1B, 2A and 2B, etc., will insure this pairing.

Moreover, it is always worthwhile to know the condition of every battery at any given time. Batteries wear out after several years' use, and the time for replacement will be indicated by non-uniformity of the readings as well as the battery's inability to work throughout a full shift period. Give each battery a number and show it in

How to Get Maximum Service from Your Charging Equipment

I—Determining Charger Voltage

Only DC can be used to charge storage batteries. Thus, if only AC is available, it must be converted into DC, either by a generator or rectifier. To determine the electrical requirements of charging equipment needed for your particular batteries, you must know the number and size of cells in each battery.

The number of cells determines the DC voltage of the charger.

About 2 2/3 v is required to charge each cell. For example, if a 24-cell battery is to be charged, the charging equipment must deliver 24x2 2/3, or 64 v. The following tabulation gives approximate voltages required to charge the most common vehicle batteries in mine use.

Number of Cells	Approximate DC Voltage Required
24	64
36	96
42	112
48	128
54	144
120	320

In determining charging voltages, however, there are two important things to remember:

1. If the charging source has less voltage than is called for by the number of cells in your battery, there is no simple apparatus available to increase DC voltage, similar to the transformers used with alternating current.

2. If the voltage of an available charging source is higher than needed, the excess voltage must be dissipated or wasted in resistors. Whether this wasting of charging current should be done is a matter of economics.

Obviously, if one or two 42-cell batteries (requiring 112 v) are charged from a 48-cell source (128 v), use of resistors would be satisfactory because the voltage difference (128 less 112, or 16 v) is not large. On the other hand, employing a 275-v source to obtain the 112 v for a 42-cell battery results in wasting 163 v (275 less 112). This would be an inefficient and costly operating practice.

It must also be kept in mind that a m-g set or rectifier is connected to the AC power circuit, rather than to the AC lighting circuit.

Considering these factors, it is an advantage to have the same number of cells in all batteries charged at the same location, since the voltage of the charging source can then be reduced to one value.

II—Determining Ampere Capacity of Charger

The ampere capacity of the charging source is determined by the size of the cell (ampere-hours) and the number of batteries to be charged. Cell size may vary from 100 to 1,500 amp-hr.

To illustrate how a charging current in amperes is determined, a 100-amp-hr cell is used (Figs. 3 and 4). From the battery viewpoint, the rate toward the end of the charge is the important value, and should be between 5 and 6 amp per 100-amp-hr cell. For a 500-amp-hr cell, for example, it is 25 to 30 amp. When the battery is discharged it can safely absorb high rates of charge, and the starting rate for a fully discharged 100-amp-hr cell can range from 15 to 25 amp. For a 500-amp-hr cell, the rate could be 75 to 125 amp.

To approximate starting rates multiplied by the number of batteries on charge at one time will determine the capacity of the charging equipment in amperes.

This example of determining charger amperage is based on an 8-hr charging period, assuming 100% capacity or rating taken from each cell. There is, however, a slight factor of safety from the charging-time angle that should be understood. During the working period for the average battery, less than 100% capacity of the cell is used. Therefore, in recharging the cell, the

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large figures on each end of the battery.

To be useful, a battery record should show:

1. Number of the vehicle in which battery is used.
2. Hydrometer reading of pilot cell at start of charge. (This is a check on overdischarge, but if working conditions are the same each day, a hydrometer reading may be taken only once a week).
3. Hydrometer reading of pilot cell once a week at end of charge.
4. Full-charge hydrometer reading of each cell and temperature of one cell taken once every 4 mo after the battery has received an equalizing charge.

It also is well to keep some spare battery parts on hand in case of an accident, determining the size of your stock by the number of batteries maintained. Jars, covers, connectors, sealing compound, separators and electrolyte should be available, even though seldom used.

LOCATING CHARGING EQUIPMENT

Obviously the location of underground charging equipment should meet the requirements of the state mining department and the recommendations of the Federal Safety Code with respect to fireproofing and ventilation. In addition, in selecting a battery-charging station inside the mine, close attention should be paid to: (1) providing adequate headroom, particularly in low coal; and (2) obtaining a location as dry as possible.

For "adequate" headroom, there should be sufficient clearance over batteries and charges to permit a man to add water, clean batteries and make repairs as necessary. Where headroom is lacking, these jobs are often skimped.

The need for a dry charging location, and for keeping a battery clean and dry on the outside, is important when any one of these conditions apply: (1) charging from the 275-v mine trolley system; (2) charging shuttle-car and tractor batteries from a balancer-type m-g set; or (3) utilizing high-voltage batteries (110, 120 or more cells).

When charging from the mine trolley (See Sec. IV), the locomotive itself and one terminal of the battery are at ground potential. The opposite battery terminal is above ground potential, or "hot," by the amount of the battery-charging voltage. It is this

charging time can be somewhat less than 8 hr since less than 100% capacity is used.

On the other hand, assume that a charge circuit available is designed for charging a 48-cell 300-amp-hr battery in 8 hr, and that increased use of the locomotive has resulted in the use of a larger battery, say one of 48-cell 500-amp-hr capacity. The larger battery can be charged on the same circuit as the smaller battery, but the charging time will be longer than 8 hr. If the additional time is acceptable, this method of charging is entirely satisfactory.

III—"Two-Rate" and "Taper" Charging

A "two-rate" charge, as the name implies, consists of two average rates. A high rate at the beginning of the charge is automatically changed to a low rate toward the end of the charge. In actual operation, both high and low rates taper a little. The automatic changeover from high rate to low rate is obtained in modern charging equipment by use of a voltage relay in a rate-changing circuit. When the battery-cell voltage rises to approximately 2.37 v per cell at 77 F, the voltage relay automatically lowers the charging rate (Fig. 3). The same voltage relay, operating with a time switch, also can be used to stop the charge automatically.

Two-rate charging is generally used wtih rectifiers, although it also is used with generators when the voltage is too high for a taper charge.

For dependable day-in and day-out repeat performance, the quality of the voltage relay and time switch is most important.

The "taper" charge (modified constant potential) is obtained inherently (a natural characteristic) in a circuit design by balancing the charging-voltage source against the battery-voltage rise during the charge. As the battery voltage rises, it approaches the value of the charging source. Hence, there is less difference between the charging source and battery voltage. Consequently, the flow of charging current will taper off in a value opposite to the way the battery voltage rises (Fig. 4).

A taper charge requires a close tolerance (plus or minus 3%) of the charging-source voltage (2.63 times the number of cells) when more than one charge circuit is on the same machine. A single-circuit taper charge does not need this close voltage limit, as the inherent taper is obtained as a natural part of the shunt-generator load characteristic.

However, taper-charge circuits are specifically designed for a definite number of cells in the battery to achieve the inherent taper. The only duty performed by a voltage-relay time-switch control on the taper circuit is to stop the charge.

IV—Insulating Helps in Charging

Some battery-locomotive users reduce the problem of leakage or stray ground currents when charging from a grounded trolley bus by insulating the locomotive from ground at the charging location. This is done either with wood rails on which the locomotive stands in its charging position, or with insulating joints in the track between the locomotive and the main track.

This method should be confined to lower-voltage batteries in the gathering class (up to 54 cells) because with higher-voltage batteries an accidental contact between the "hot" side of battery and the locomotive would make the latter hot and create a shock hazard. Higher-voltage batteries, such as those of 100 to 120 cells used in mainline and power-tank service, are preferably charged from an ungrounded source. Such batteries require the same caution in installation and operation as any other electrical equipment in the 250-300-v class. It is especially important that they be kept clean and dry because of the large potential differences that can be set up across the small paths of a battery's rubber parts.

Ordinarily, it is not desirable to charge shuttle-car batteries in steel trays on the car, especially from a grounded system, because both trays are grounded to the car body and the car itself is usually at ground potential as a result of mud and wet bugdust on the tires. For the same reasons, tractor batteries should not be charged with a grounded system while on the tractor. This hazard can be overcome by insulating the steel tray from ground by placing it on a dry wood platform, on wood cribbing, or, as in more recent shuttle-car installations, by mounting the charge tracks on wood ties.

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large voltage difference, between the "high" or "hot" side of the battery and the grounded steel parts of the tray or compartment close by, that can produce leakage or stray ground currents. Such currents can be of serious and damaging proportions when the battery is wet and dirty, because the "insulation" of the rubber parts of the battery is reduced or eliminated by the wet "dirt." Therefore, it is most important to keep the battery clean and dry, as previously recommended, to avoid stray or leakage currents and their effects.

Dry charging locations, and clean and dry batteries, are necessary: (1) to avoid electrical shock, especially on high-voltage batteries; and (2) to eliminate erosion of metal trays and charring of non-metallic parts, or possible fire. Localized ground currents create heat sometimes sufficient to burn rubber parts, because acidified water or electrolyte will conduct electricity between metals, both outside the cell on wet batteries where it can do harm, as well as inside the cell where it does good.

Charging stations outside a mine will be generally satisfactory if the equipment is enclosed and protected from the weather. Charging units outside the mine should have about the same ventilation as other work areas.

With automatically controlled charging of the proper capacity, there is no acid spray or smell. With vent plugs kept in place, water added to the correct height and charge rates as recommended, you will avoid high temperatures, acid spray and wet battery tops.

The successful application of batteries to vehicles depends upon three things:

1. A battery of adequate size necessary to do the job and avoid overwork and overdischarge.
2. Correct watering and cleaning practices as recommended above.
3. Charging automatically at safe rates and in the right amount.

Charging equipment that is correctly designed for the battery and has reliable automatic controls is "more than half the taking care of batteries." Obviously, such important money-saving equipment should not be neglected. It should be checked once a week for performance, and blown free of dust whenever necessary. Parts requiring lubrication should be on routine maintenance schedule.

THE RIGHT EQUIPMENT, selected to fit the job, maintained in good operating condition and worked at peak capacity, is necessary for an efficient operation.

Successful Contour Stripping

- **Some strip mines fail for lack of forethought**
- **Yet planning and good supervision will pay off**
- **Here's the way to get on the right track**

STRIP MINING in hilly country is much more than acquiring an unmined area of coal and mining it with any available equipment. Contour stripping introduces such operating problems as difficult equipment moves, frequent power line moves, long hauls, heavy water inflow and frequent road construction, all of which are not encountered in area stripping. Without careful planning, equipment and manpower performance will be poor. Here are some points to be considered in developing a new strip mine.

ACQUIRE PROPERTY

In acquiring property, you'll first want to investigate property ownership in the potential strip area, including property adjoining the area to be stripped, bearing in mind that you will be spoiling on a downhill slope and will need ample spoil area. Legal and engineering examination of property deeds is necessary to avoid headaches once stripping has begun.

Investigate any exceptions or special conditions which may aid or hinder mining operations. For example, you may buy a piece of land, including surface and mineral rights, yet there may be a restriction in the deed which forbids strip mining within a given distance of buildings on adjoining land. A relatively insignificant item like this can be a major problem once operation begins. It is better to have more property and rights than you need.

While investigating surface ownership you'll be able to assemble information on mineral ownership and mining rights. If a surface and mineral ownership map is not available, it will pay to have competent engineers plot deed descriptions of properties as you purchase or lease them. There is nothing more useful in opening a new mine than an accurate property map. You will be able to use this map to spot key areas which must be acquired or leased to provide stripping continuity.

Gas wells and gas lines may be a major problem if your strip coal is in a gas field. You'll have to locate all wells and pipe lines, plot them on the property and mineral maps and determine whether they (1) make stripping impossible, (2) limit you to using smaller capacity equipment which can work around the wells and lines, or (3) make it necessary to relocate pipe lines while stripping and relay them in the original location when stripping is completed.

After completing the real estate investigation, your next problem is to determine how much coal is on the property, where it is located, what kind of material covers the coal and the quality of the coal.

In most instances an outcrop map of some sort will be available as a starting point but you may find it necessary to start from scratch and prepare your own map from field or aerial surveys. In any case you'll need a good outcrop map.

PROSPECT THOROUGHLY

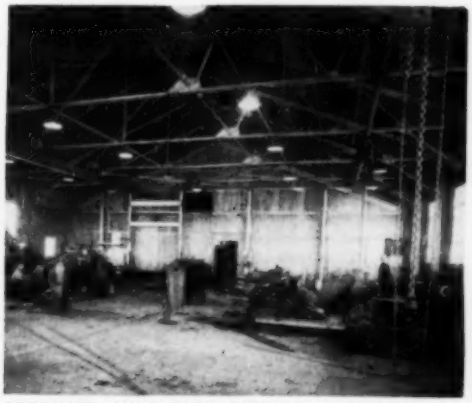
Prospecting to determine the quality of coal available is the next step in opening your new strip mine. Examine carefully the coal outcrop with relation to your property map and then locate areas where you want information about the coal seam. You'll need

GOOD MAPS provide basic information for property consolidation, outcrop location, prospecting, sampling, overburden computation, equipment selection and road building.

CONSTRUCTION OF GOOD ROADS assures all-weather operation and reduces truck maintenance cost.

PROPER BLASTING PRACTICE is a major factor in economic overburden removal.

REMOVAL OF FINE LOOSE DIRT from the top of the coal before loading helps produce a quality product.



ADEQUATE SHOP FACILITIES keep bulldozers, trucks and heavy equipment in top operating condition.

information from all parts of the property to get a good picture, especially if you are considering deep mining of coal which can't be strip mined.

Diamond drilling is relatively inexpensive and provides information about the coal seam that can be obtained in no other way. Drill holes are of particular value in strip mining because they tell you something about the kind of rock you will have to remove from the coal. Since explosives are a big cost item in many strip operations, borehole data will give a clue as to how much explosive will be required. In addition, the coal cores can be examined visually and analyzed chemically to determine quality.

Outcrop prospecting has come a long way from the day of the pick, shovel and wheelbarrow, although these still have their place. Now, the bulldozer is the modern prospector. It is true that it takes longer for a bulldozer to reach the job but once it is there it will move more dirt in a day than three men, using hand methods, could move in a week. In addition to making outcrop openings, a bulldozer is useful in making test pit openings in broad hollows where there is light cover, say, under 20 ft.

Walking around the outcrop will in many cases be rewarded by finding old unsurveyed mines, opened many years ago by some farmer to obtain house coal. In most instances these mines were driven underground several hundred feet and remain accessible. They offer an excellent opportunity to get good channel samples of the coal.

If there are any mines nearby in the same seam of coal, it is well worthwhile to obtain all the information possible about mining conditions, coal thickness, coal analysis, type of roof and bottom and other pertinent data.

STUDY THE OVERBURDEN

After you are convinced that there is sufficient coal on the property you must start thinking about the overburden you will have to move to mine the coal. There are several ways to approach the problem. If you have diamond core drilling done to prove the coal you will at the same time have a record of the type of overburden. Geologic bulletins, available from government agencies, are a source of information on rock formations. If there are any strip mines in the vicinity of your property you naturally will want to visit them.

CHECK THE QUALITY

Coal quality determines, to a great extent, whether you can sell the coal you produce. You'll want to get complete analysis, including volatile matter, fixed carbon, moisture, ash, sulfur, Btu, fusion, grindability and coke button. A good procedure is to have these analyses plotted on your property maps so you can get a complete picture of the coal seam. Any suspicious results should be given careful attention and sufficient check samples taken until you are sure that you have a complete picture. In evaluating results of analyses, it is always good practice to ask yourself how they compare with deep-mined analyses in the same seam.

MAP THE AREA

You'll need the slope of the ground, ratio of overburden to coal and other surface features before starting work.

In recent years aerial surveys have become a valuable tool in obtaining accurate topographic maps quickly and cheaply. If you have several thousand acres of coal land, it will pay you to consider having an aerial survey made of your property. Topographic maps made from the survey could be used as your stripping work maps.

Here is a brief summary of the procedure you will follow if you decide to use this type of map. First you'll call one of the companies qualified to make aerial surveys and present your problem to them. They'll want to have a conference with you and your chief engineer to settle certain technical problems. Among these are selection of the area to be flown, map scale, contour interval, size of contour sheet and coordinate system. They'll also want you to help them establish control survey points. You can use U. S. government triangulation stations, your own system or a combination. If surveys already have been made on parts of your property and have been tied into a triangulation system, it will be wise to use this system and coordinate values for your aerial survey.

A typical map furnished to you might be made on a scale of 1"=200', 30"x25" in size with a matchline and border. It might have a 5-ft contour interval, and will show wooded and cleared areas and have all the topograpy including roads, streams, houses, fences and power lines.

These maps provide an engineer or strip-mine operator with a valuable tool. For example, they can be used to select routes for moving equipment, building roads or power lines, planning strip-pit drainage and constructing cross sections to determine overburden ratios, quantity of strip coal available and type of equipment needed. If deep mining is to be conducted along with strip mining or in the future, they will be useful in planning mine projections and limits of working.

If you feel that your property does not require an aerial survey, you will have to use an engineering crew to establish survey control, get topographic data and then make maps. This process is relatively slow and costly, but sometimes is more suitable.

SELECT A STRIPPING LIMIT

With all the engineering data at your finger tips you will be able to tackle the problem of how much rock you want to move in uncovering coal. Surface profiles, constructed from aerial contour maps or conventional methods, extending well above and below coal level, will aid in reaching a decision. Too many variables prevent setting a definite rule for establishing a highwall limit or stripping ratio. For example, you must consider the following: (1) nature of overburden, which affects blasting costs and ease of handling, (2) slope of the ground, (3) thickness of coal, (4) quality of coal and (5) selling price of coal. When all of these have been given proper consideration you will be able to think about stripping limits.

SELECT EQUIPMENT

Naturally, any limit you select for a highwall will be governed, to a great extent, by the type of equipment you intend to use for stripping and loading. Factors you must consider before selecting equipment are: (1) total tonnage of coal available for stripping, (2) surface features, (3) daily production desired, (4) spoil area available and (5) type of overburden to be handled. For example, it would be foolish to make a large capital expenditure for high-capacity equipment capable of uncovering 3,000 tons of coal per shift when you have only a relatively small reserve of coal, say, 1,000,000 tons. Likewise, it would be poor judgment to use small-capacity equipment when ample reserves are available. A series of conferences between operating, engineering and equipment manufacturing personnel will help you arrive at the proper answer.

After completing the groundwork you are now ready to get the production wheels rolling. Carefully check your equipment and supply lists to be sure that no critical item has been omitted. Before supplies and equipment come in too fast and are carelessly stored you'll want to have a good supply house and shop built and a system of issuing supplies in effect. Many times in the rush to get in production, supply and maintenance are forgotten, with the result that a great deal of money is lost because supplies are received and stored in a careless manner, and no facilities are available to service equipment.

BUILD ROADS

Good roads are a must if your strip operation is to be successful. Good drainage will generally permit all-weather use of haulage roads if they have been built with a good rock base. Ditching and well-placed drain pipes are all that you need to have good drainage. Dividends received from good roads are maximum production with minimum number of trucks, lower truck maintenance cost, and longer truck life.

PREPARE OVERBURDEN

There is no best way to prepare overburden for removal. Each operation is an individual problem to be solved after careful consideration has been given to all factors—slope of ground, width of cut, quantity and nature of overburden. Possible equipment combinations are shovel, shovel and bulldozer, shovel and dragline.

If it is necessary to drill and shoot overburden before removal, you have the choice of drilling vertically or horizontally. Your choice will be governed by the type of overburden. For instance, if the coal is overlain by 15 ft of hard shale covered by friable material it would probably be best to use a horizontal drill, locating holes in the hard shale so it can be broken with a minimum of explosives. A relatively uniform strong overburden can probably be broken better if the holes are drilled vertically. Regardless of how you drill blastholes, care should be taken so that the coal bed is not disturbed by the blast.

LOAD CLEAN COAL

Overburden removal with bulldozers, shovels or draglines does not prepare the coal for loading. Final cleaning prior to loading may be accomplished by bulldozer, road grader, mechanical sweeper, men with pick and shovel in various combinations. Pit cleaning is especially important if washing facilities are not available for all sizes.

Your coal-loading shovel operator is a key person in quality control. He can either load coal representative of the seam or he can dig into the bottom and pick up fine dirt. Opening a new mine offers a wonderful opportunity to train your shovel operators to load clean coal.

Size of coal-loading shovel is something to be decided by the coal operator because he may want to use it for removing overburden as well as loading coal. If you are planning a large operation, you will want to confine them to coal loading. In any case, it should have more capacity than required to produce your required daily tonnage.

Quality control will be one of the biggest headaches confronting you. In addition to the normal problems of loading a clean dry blocky product, you will sometimes be confronted with the problem of whether to load poor-appearing normal-analysis coal or reject it as substandard. Thousands of dollars will depend on your on-the-spot decisions. Too many wrong decisions could put your operation in the red. Then there is the constant fight with the coal-loading shovel operator to load clean coal. Blending coal as you load it will insure a uniform quality of feed to the preparation plant.

PLAN EQUIPMENT MOVES

Unless you have been fortunate enough to have acquired property which permits continuous stripping you will have equipment moves to make as you deplete mining areas. In mountainous areas this means planning, road building and installing or changing power lines. Planning includes: (1) a strip time schedule which will tell you when you must move to a new area; (2) selection of next area to be stripped, route for moving equipment, route for power lines; and (3) having a reserve of coal available so production continues while coal is being stripped in the new area. The problems of scheduling stripping, selecting new strip areas, routes for moving equipment and for power lines can generally be solved with the help of your engineering staff, but your strip superintendent is the only one who can assure a satisfactory inventory of coal.

Roads should be built with maximum grade not over 10%. Don't guess at road alignment or grade—have an engineering crew lay out the route on a contour sheet and then flag the course in the field. Aerial contour sheets are especially good for this work. This method will assure you of the best route and permit a bulldozer to follow their line easily while making the new road. If a large machine like a dragline is to be moved to a new location, you will have to drill, shoot and use a shovel to make a wide roadway. Experience alone will tell you how long it will take to make roads on your property.

ESTABLISH GOOD MAINTENANCE

Equipment will be subjected to the worst working conditions possible and will require frequent and expensive maintenance. You can't do much about improving conditions other than to have good well-drained roads, dry pits and good machine operators, but you can set up a good maintenance shop headed by a live-wire maintenance man experienced in strip-mine maintenance, particularly preventive maintenance. You'll learn that you can't afford to have a million-dollar machine idle 8 hr while repairs are made. A good maintenance foreman will repair a weak part before the equipment fails.

To do a good job, your maintenance crew will need working space for all-weather servicing of equipment, particularly a building where bulldozers and trucks can be torn down, repaired or rebuilt. Key repairmen will be diesel mechanics and welders.

GENERAL HINTS

Here are some general suggestions you may find useful as your operation develops. Don't rely on guess work to determine your highwall—have your engineers flag the stripping limit so you are sure. Plan and provide drainage for all areas so they will drain after abandonment, bearing in mind that you may want to auger or deep-mine coal not stripped. Leave highwalls and pits in such condition that little additional work will have to be done if you start deep or auger operations. This means removing all loose and dangerous rock from the highwall as you remove the overburden and leaving sufficient room in the pit for auger operation.

Opening a deep mine along the highwall is not as easy as it looks. You won't be able to move in with substation and mining equipment and begin loading coal—protection must be provided for men and equipment working near the portal. In many instances, this means erecting concrete or steel passageways and covering them with dirt. There will be grading and drainage to be taken into consideration and you may have to install several hundred feet of 36-in drain pipe to handle large quantities of water during the rainy season.

If you plan to auger-mine, the highwall must be left free from loose and overhanging rock, the pit floor must be left as clean as possible, truck roads must be left in good condition and pit drainage must be provided.

Without good supervision the best equipment and the finest stripping opportunity will be a losing proposition. If possible, get seasoned live-wire supervisors and assign them definite duties, coupling responsibility with authority. They must have faith in you as their boss and that you stand behind them in performance of their duties. If you can't get a full seasoned staff, then train men on the job, especially in the problems of coal industry so they will know that strip mining is more than uncovering and hauling coal.

STRIPPER IN ACTION taking a 2-ft slice of coal, previously top cut by a modified longwall machine operating on the face conveyor. The stripper plows the coal to a special conveyor along the face, and works back and forth from either end.

Roof Control in Longwall

How a successful caving system was worked out for stripper operation on a 270-ft face at Lancashire No. 15 mine.

By RICHARD T. TODHUNTER JR.
General Manager, Barnes & Tucker Co., Barnesboro, Pa.

SUCCESS in longwall or semilongwall mining, now the subject of increasing interest in the United States, is, of course, dependent upon a satisfactory method of controlling the roof which can be maintained without undue labor cost.

Briefly, the accepted theory of roof control on longwall faces is this: The higher beds of the strata bridge over the excavated area so that they transmit the weight to the lower beds at points in advance of the face, and behind in the worked-out area, so that the load on the immediate roof at the working face is relieved. Fig. 1 shows this diagrammatically.

It is accepted that the average load of the overlying strata is about 100 lb per sq ft per foot of depth. It can be appreciated, therefore, that it would be impossible to devise an artificial support to carry this load. Thus, the two abutments—one over the coal and the other in the gob—relieve the pressure at the working face and thus provide a basis for good roof control.

The supports in this working area must be designed to reduce the subsidence of the overlying strata to a minimum and thereby reduce roof fractures resulting from bending. The extent of bending that will cause fracture depends upon the nature of the strata, whether brittle or elastic. Fig. 2 shows the effects of convergence, with breaks forming in the roof in advance of the face, and demonstrates how supports which are set quickly and tightly offer initial support and help prevent convergence.

Another important factor is keeping the face line straight to prevent uneven support and permit a consistent rate of face advance.

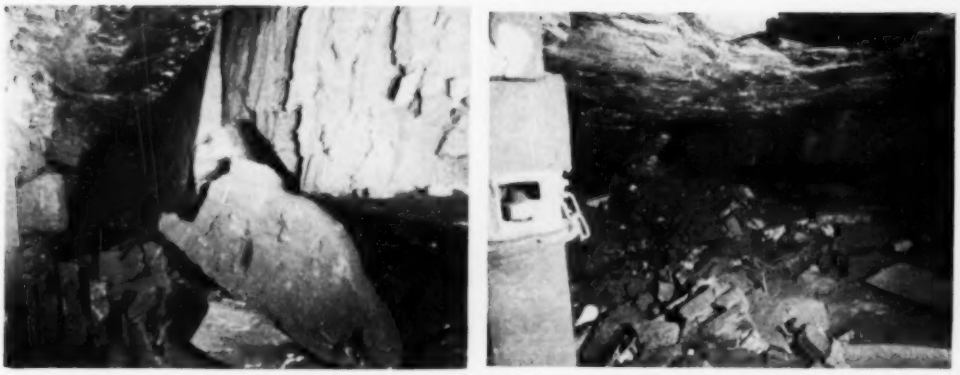
TWO BASIC SYSTEMS

There are two basic systems of roof control. In the first, the goaf or waste behind the face is supported by packs, which are gradually compressed until the overlying strata become stable.

In this process, the forces bridge from the solid coal back to the point where the packs have become solid. These packs are built at right angles to the coal face and generally are 12 ft wide with 24-ft "wastes" between. The waste is allowed to cave and the material thus provided is used to build the packs. The roof next to the face is supported by props and bars, which are advanced with the face. Wood and steel chocks often are installed in the wastes to provide additional support and form a breakoff line.

This method lends itself to mechanization by solid stowing, in which the entire waste is filled by material

Abstract of a paper presented at the 40th National Safety Congress & Exposition of the National Safety Council.



INITIAL BREAK behind the chock line normally produces large pieces, with the break extending up 15 ft or more.

brought in for this purpose. Stowing can be done mechanically or by blowing the material in with compressed air. Refuse for stowing must be prepared, brought in and distributed along the face. Thus, the method is costly even though providing excellent support.

The second method, which we have adopted for our Lancashire No. 15 mine, is to cave the roof completely in the waste. This permits the caved material to fill in the mined-out area. To do this, it is necessary to provide a sufficiently rigid line of supports to break the roof high enough to fill the waste completely. It is generally agreed that the roof must be caved to a height three times the seam thickness to fill the waste sufficiently to support the upper strata. Fig. 3 illustrates the basis of this system.

It will be seen that the upper beds are permitted to bend until they are supported on the fallen material. The roof immediately at the coal face can be considered as a cantilever beam, the breakoff supports being strong enough to break the overhanging portion of the lower beds. It also will be seen that the strength of this cantilever will depend upon its length. Therefore, it is necessary to keep its length to a minimum to avoid a break along the coal face. Thus, the closer the breakoff line, the stronger the roof at the face. Length of the cantilever also can be related to the convergence because it is most unlikely that a break can develop along the face unless the immediate roof has dropped.

In this way, depending upon the nature of the roof and floor, length of cantilever in relation to convergence is determined. For example, where the immediate roof is brittle, the permitted convergence is less than with a more-elastic material. Obviously, convergence is largely dependent upon

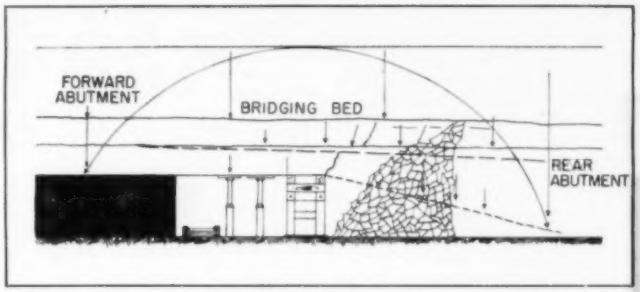


FIG.1—HOW HIGHER STRATA bridge over mined-out area and relieve the load on the immediate working face.

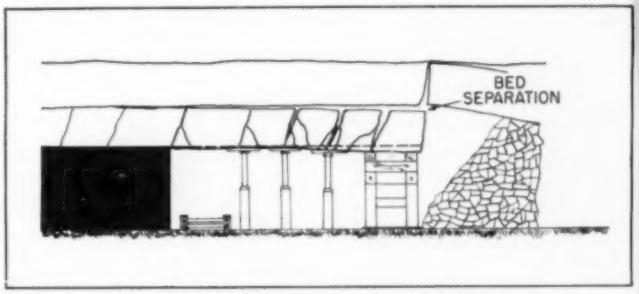


FIG. 2—HOW CONVERGENCE affects top at the working face.

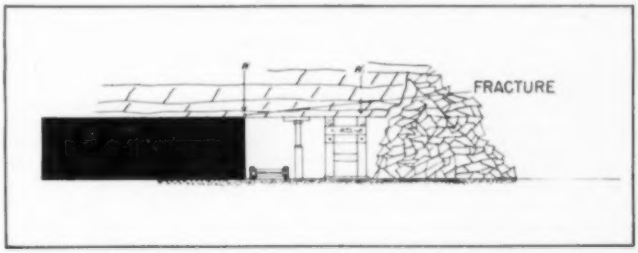


FIG. 3—HOW CAVING is employed to fill waste behind the working face.

HOW THE STRIPPER FACE LOOKS after the machine has passed and the conveyor is moved up prior to top cutting.

SUPPORT AT THE FACE is provided by special British-type props and wood chocks. The latter break the top.

cantilever length and dead weight, so that adequate roof control can only be arrived at by experience. Also, it will be seen that with caving, the weight on the face is reduced because the stress is immediately relieved in the waste, whereas, with packing, the weight must be supported continuously. Again, the principles of a straight face, regular advance, etc., are most important.

Mechanization of the latter system is much simpler because no material need be transported into the working area. The problem becomes one of systematic withdrawal and advance of supports.

CAVING PREFERRED

In most United States mines, cover depth is such that roadways can be driven in the solid without excessive crush occurring. Therefore they can be used without further attention, such as brushing, except as necessary for height in thin seams. With our present equipment for driving roadways in the solid, we have facilities for developing large panels which can be retreated as single blocks, provided the roof-control system will permit a highly mechanized longwall face to be operated.

Recent advances in Europe have resulted in several machines capable of producing a high tonnage by continually removing coal from a longwall face. The conveyor used with this system is advanced behind the coal-producing machine. Therefore, the only remaining problem is to advance the supports to provide a completely continuous production system.

With our conditions therefore, it follows that a caving system is to be preferred which, combined with supports that can be continuously advanced, provides both an excellent roof-control system and economies in labor and materials.

UPPER STRATA CONTROL THE AIM

This very brief description of longwall face-support methods illustrates the point that the aim is control of the upper strata. Once this has been achieved, control of the roof at the working face is simpler because the forces are comparatively small and the goal is preventing loose material from falling. In either a packing or a caving system, the main attention is directed to the waste edge and it is at this point that success or failure will be attained. The aim remains the same: Provide adequate support to the upper strata to prevent excessive convergence with consequent breaking of the roof at the coal face.

It has already been stressed that certain rules must be observed for success. One is a regular rate of advance. It is generally agreed that a fast rate is preferred but the optimum will depend upon local conditions. It may be that the extraction rate can be too fast, with the result that the main roof will be unable to settle in the time available and the face may have to rest after a certain distance has been advanced. Therefore, length of face in relation to rate of travel may require adjustment. Nevertheless, a fast rate of extraction is attractive because it allows less time for disturbance of the entries and also permits faces or pillars to be developed and extracted quickly.

It has also been noted that the effect of coal extraction is apparent in advance of the face, meaning in turn that the forward abutment is well over the face and its effect can be measured some distance ahead. In retreating faces, there may be some effect on roadways or entries. It follows that the narrower the roadways are the less they are susceptible to disturbances. For this reason, adequate support ahead of the face is most important. Again, the shorter the time the roadways are left standing the better. Here is another advantage of fast development and extraction.

THEORY INTO PRACTICE

Our experience in the "B," or Lower Kittanning, seam shows the application of these theories in practice. It was decided to work out a 300x1,500-ft panel of coal by a retreating longwall face, using a Mavor & Coulson Samson Stripper, which removes a 2-ft slice of coal the full height of the seam and loads it onto a face conveyor alongside. As the machine moves along the face the conveyor is snaked over behind it so that it can start back along the face as soon as it reaches the end. Fig. 4 is a general plan of the face. The headings driven to develop the face were made 25 ft wide to accommodate the stripper at each end and permit it to be moved forward for the next traverse.

The "B" seam varies in thickness from 38 to 42 in, and is overlaid by 7 in of bony, left up to form the top. The top 5 in of coal is hard and combined with bony. The middle of the seam is soft, but the bottom 6 in is harder, with an indeterminate parting at the floor. Pyritic intrusions are present in all forms.

Above the bone is 20 ft of dark shale with further beds of shale, sandstone and thin beds of sandstone above this. Depth of cover where the machine is working is 520 ft. The floor is 5 in of fireclay with 7 in of coal below and again fireclay. The floor is reasonably hard but inclined to lift after exposure.

A characteristic of the seam is its undulating nature which results in sharp and frequent changes in grade. Cleavage is not pronounced, but the main cleat lies approximately 45 deg to the fact line being worked.

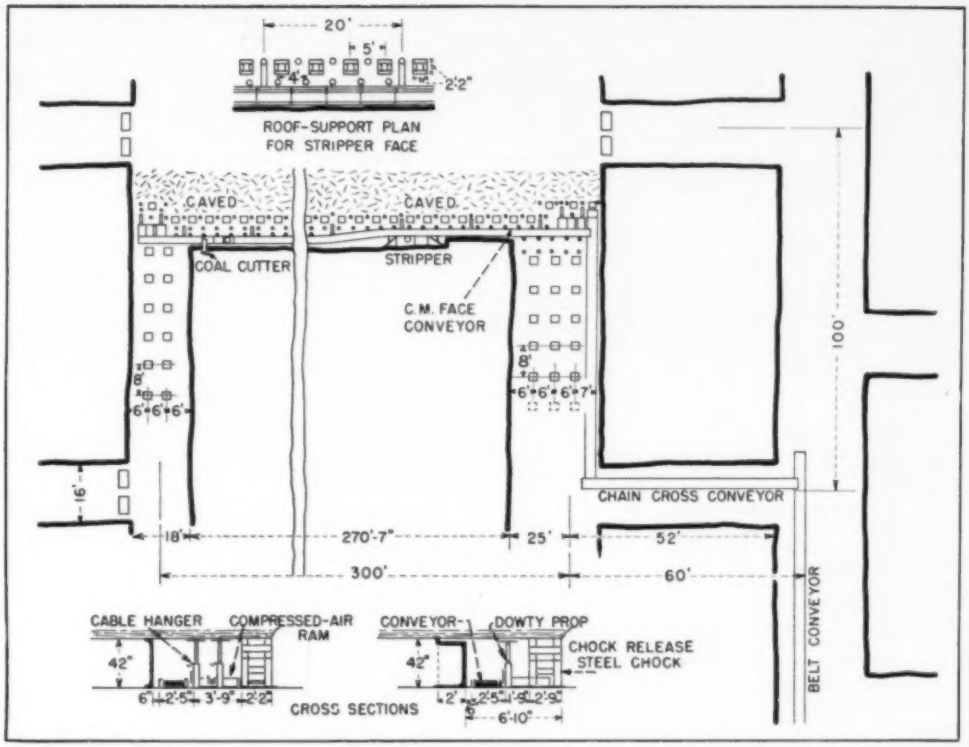


FIG. 4—FACE LAYOUT for stripper operation at Lancashire No. 15 mine. With crews of 10½ men, two strips can be taken off the face per shift, yielding 220 tons. The face operates on a two-shift basis, with the third shift for maintenance. Tons per man has been as low as 15 and as high as 23, with 18 tons per man considered as average.

It had been decided that total caving would be tried and it was agreed that special supports, as are now used in Europe, would be used. In the first instance, the chocks were to be set in two rows in a staggered formation, with 4 ft between rows and 8 ft between chocks in the same row. The chocks were advanced every 8 ft of face advance. The idea was to give the men confidence by always having a row of chocks set.

The props were set in rows 2 ft apart with 4 ft between props in the same row. These were set as soon as the conveyor was advanced. Convergence stations, using a recorder to measure the movement of both roof and floor, were established at 20-ft intervals in the entries along both sides of the pillar to be extracted. Boreholes were put 40 ft into the roof in the lefthand entry to permit observing strata movement in advance of the face.

PRODUCTION BEGINS

On Oct. 6, 1951, the face was started from a 16-ft room driven to connect the two sets of entries. No roof caving occurred until the face had advanced 70 ft from the solid rib. During this period, the rate of advance was fairly slow but permitted the men to become familiar with the removal and re-setting of supports. At this point, the waste at the tail end of the face started to cave and caving then spread along the full length of the waste.

About a week later the remaining roof broke and caved very heavily over a period of about 12 hr. Apart from one small break about 40 ft long, there was no damage to the roof at the face and the supports withstood the load without damage. This initial break indicated that the support system was sufficient to cave the roof along the back row of chocks. This greatly encouraged the men and gave them confidence in the system. The roof also caved along the rib sides without any tendency to ride over the cribs into the crosscuts.

After the initial cave, the roof continued to break with each advance of the chocks and broke to a height of at least 15 ft, adequately filling the waste. Nevertheless, it was apparent that the second, or rear, row of chocks was carrying all the weight and consequently the chocks were difficult to withdraw. Withdrawal involves releasing the chock releases, drawing the chock forward and then rebuilding it, after which the Dowty props are withdrawn with a long bar with a hook fitting the "D" link on the prop.

It was decided that it would be better to reduce the distance of the breakoff line from the coal face by dispensing with the back row of chocks, thus leaving only one row with the chocks set on 5-ft centers with a Dowty prop between each. This was done and eased withdrawal of props and chocks, but they still were being moved up with each 4 ft of face advance. The waste continued to cave satisfactorily, except for an occasional break along the coal face. Such breaks were not serious and often caused the fall of only a small amount of bony. However, it was found that these breaks and falls could be eliminated

by keeping the chocks close to the conveyor and moving them up continuously as the face advanced. In this way, the cantilever of supported roof was kept to a minimum and roof conditions were greatly improved.

During this period, experiments were made with the type of wood used in the chocks. Originally, unseasoned 6x6-in by 2-ft oak was used, but was inclined to be soft and crush. It was replaced by laminated blocks of kiln-dried maple with much greater compressive strength.

The aim throughout has been to provide maximum resistance to break the roof and keep convergence to a minimum. Wood lids were used as cap pieces to keep the Dowty props from penetrating the 6-in bony but, generally, it was found that there was little tendency for this to occur.

The usual practice is to advance the chocks from the center of the face—the men working toward each end. Under our circumstances, however, this was not possible, and it was found that there were no bad effects from moving the supports from either end. With continuous mining of this type, when it is desirable to move the supports immediately behind the conveyor, it is essential to do this from the ends. However, the very fact that the conveyor is advanced in this manner permits the supports to be kept much closer than would otherwise be possible.

Although the floor is by no means ideal and is inclined to soften and lift when exposed, we encountered no difficulty and the floor remained hard enough to carry the props without penetration. The area of the chock bases is large enough for adequate bearing even on a soft floor.

REGULAR CAVING ATTAINED

Control of the roof was established so that regular caving in the waste occurred with each withdrawal of the chocks and props, and although, on occasions, a small break would occur at the face, this could always be related to a local patch of weak roof, and was generally at a point where there was considerable deformation in the seam, such as, a sharp dip or roll, and was not induced by the method of working. These occasional breaks, however, can be supported locally without any great difficulty by using wood bars set over the conveyor track.

Caving in the waste often is in large pieces, with the break extending up 15 ft or more, as shown in an accompanying illustration. Above this, the material is smaller, and it is desirable that the caved material should be broken up to fill the waste. Nevertheless, there is no doubt that the caving is adequate to support the upper strata, and the face has now advanced 1,200 ft with good roof control, proving that these results can now be considered consistent.

It has been suggested by some mining engineers, with previous experience in attempting to control this roof on a long face, that a major cave would occur at a distance of 280 ft from the rib and the face would be lost. It also is suggested, however, that modern supports and technique prevented this. Although in the past, "weights" and losing the face was by no means uncommon in longwall, it is now considered to be bad management if such accidents occur.

It has already been explained that the effect of working is evident well ahead of the face and that therefore the entries may be subjected to considerable pressure. Consequently, it was decided to set chocks in the entries for a distance of 40 ft back from the face (Fig. 4). Unfortunately, before this had been completed in the tail entry, and in fact well in advance of the face, half the width of the entry caved for about 300 ft. This entry had been driven some 18 mo before the longwall face started, and it is considered that the caving was not the direct consequence of working the face. Once this caved portion had been passed, no further disturbance occurred.

In the main conveyor entry, the roof remained excellent, with only occasional local patches of broken roof where this had been encountered in driving the entry, which had been completed immediately before the face started. Nevertheless, supporting the entries in the vicinity of the face and back to a point where no movement will occur is most important.

STRATA ACTION

The U. S. Bureau of Mines was interested in observing the effect of longwall working on the roof, and an experienced engineer from the Mining Research Section made observations throughout this period. To observe strata separation, boreholes were drilled 20 ft in the roof at various points in the tail entry. Stations were established in advance of the face in both entries where convergence of the roof and floor could be measured, and a convergence recorder was used at various points along the face.

Stratascopic observations in the boreholes showed that when the face was 90 ft from the holes, separation started to occur in the lower layers. Then, as the face approached, separation started in the upper layers. Lateral movement of the layers also was noticeable, with the lower layers moving the greatest distance toward the center of the entry and extent of movement decreasing toward the upper strata.

The convergence stations in the entry showed that the distance in front of the face, where convergence first could be measured, increased with the span of the mined-out area until, at a distance of 80 ft, it became constant. The convergence increased from 0.01 to 0.6 in where the face approached the station, and the rate increased rapidly as the face approached. The rate on the face between the coal and the waste edge is highest during the removal of the chocks and averages 3 in at a distance of 12 ft from the face.

KEY CONSIDERATIONS

From our experience, the following conclusions can be drawn:

In applying longwall to the rapid extraction of large pillars, the retreating system undoubtedly is the most attractive in view of our moderate depth of cover and because it can be readily superimposed on our existing methods of working.

Full caving is to be preferred for satisfactory roof control because it lends itself to full mechanization of the roof-support system, with savings in labor and materials—all material recovered from the mined-out area.

With full caving, the supports should be kept as close to the coal face as possible and should:

A. Provide a rigid breakoff line along the waste edge.

B. Be kept in a straight line—as should the face itself.

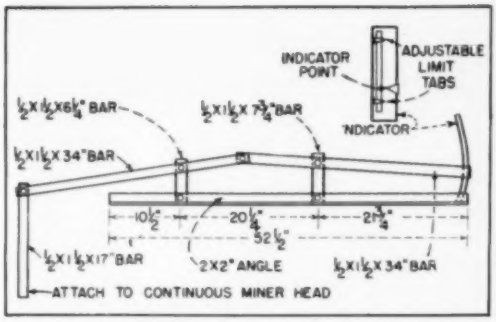
C. Be set as tightly as possible to the roof to provide early support.

D. Continue to provide support with the minimum yield, such as, penetration into the floor, crushing of wood blocks, etc.

The aim is always to provide as strong a roof as possible over the working area by keeping the cantilever of the supported area—and the convergence—to a minimum.

The support of the entries within the region of the face is most important to ensure maximum resistance to forward pressures in advance of the face.

We are satisfied that we can control the roof positively by using the proper type of supports and adopting the principles of roof support set forth previously, thereby providing greater safety for both men and equipment. To date, we have not had a lost-time accident in this type of mining.



JOHN BEDNARSKI points out his ripper-head indicator on a continuous-mining machine. The sketch shows how the indicator is made

Mechanical Indicator Shows Ripper-Head Position

KEEPING THE RIPPER HEAD of a continuous miner out of the roof and bottom was somewhat of a problem at Harwick mine, Duquesne Light Co., Harwick, Pa., until John Bednarski, mine mechanic, designed a gage to show the operator the position of the head in the coal, says James H. Truax, mine superintendent.

Mr. Bednarski's gage consists of a pair of tandem levers, with one end of the pair attached to the elevating ripper head through an extension arm and the other end swinging free across an indicator arc near the operator's control station. The ratio of the motion of the ripper head to the motion of the indicating point is 10:1.

As shown in the illustrations, the gage consists of an angle-iron base with bar-steel fulcrums and levers bolted to this base. The assembly is mounted on top of the continuous miner, as shown in the photo.

There are variations in the thickness of the seam, however, making it necessary for the operator to reset the adjustable limit tabs on the indicator arc from time to time. This is done after each 6-ft advance while the timber-men are at work. To set the tabs, the operator elevates the head to the roof and sets the top tab opposite the indicating point. Then he lowers the head to the floor and sets the bottom tab. The ripper head and the indicating point travel in the same direction.

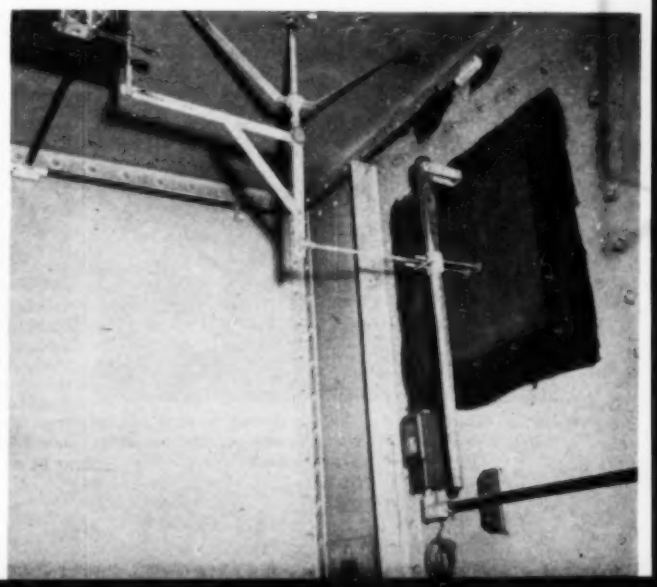
As to the benefits, Mr. Truax says bits are lasting longer and the ash-content of Harwick's raw coal, all of which is produced by continuous miners, is under control.

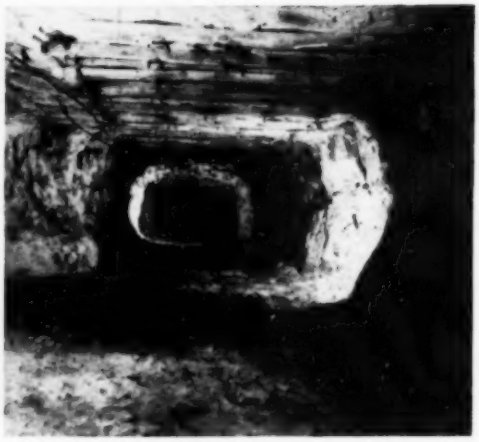
Belt Diaphragm Operates Fan Signal

A BELT DIAPHRAGM and switch combination, designed and installed by R. A. Cunningham, chief electrician and master mechanic, MacAlpin Coal Co., Raleigh County, West Virginia, provides a positive warning signal when the mine fan stops or slows down.

A 20x22-in piece of 4-ply conveyor belt, mounted in the steel wall of the fan duct, actuates an electric switch through a lever arrangement when mine air pressure drops. Normal operation of the fan, at 3.5-in water gage and 120,000 cfm, produces approximately a ½-in concave depression in the center of the diaphragm. A series of levers connected to the center of the belt multiplies any movement and is adjusted so a 3/16-in movement actuates the warning switch. Design permits adjustments in three parts of the linkage.

The mechanism is mounted in the motor room adjoining the fan duct, where it is protected from the weather and is readily accessible for inspection and testing. To test the mechanism, a repairman pulls out the lower end of a wooden lever enough to check that the mercury switch operates and the alarm sounds in the nearby shop.





CONTINUOUS MINING MACHINES, pick-up loading machines, shuttle cars and shaker conveyors, operated by 6-man crews, successfully completed Sunnyside's airways. And bolted top provides maximum useful airway area.

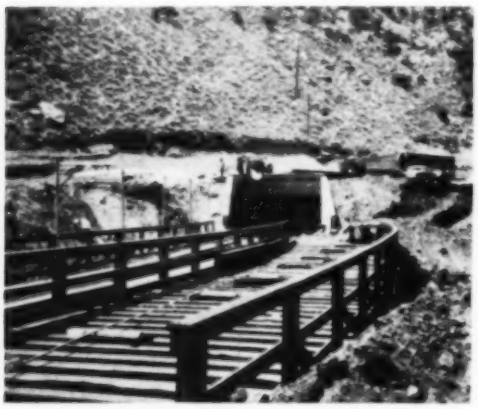
Uphill Continuous Mining

THE JOB: Driving six airways 1,500 ft to the outcrop through a seam of coal pitching as steeply as 22%

THE TOOLS: Continuous miners, shuttle cars, shaker conveyors, roof bolts

THE RESULTS: Efficient machines provide trim, low-resistance air openings

AN UNUSUAL APPLICATION of continuous mining machines has featured development at Sunnyside No. 1 mine, Kaiser Steel Co., Sunnyside, Utah, where two of these units recently completed the job of driving six airways to the outcrop through coal pitching as much as 22%. The performance of the continuous miners in doing this specialized work has aided Sunnyside officials in improving ventilation during the modernization and expansion program now in progress at the property.



NEW HAULAGEWAY, which eliminates a slope, is another indicator of modernization as Sunnyside hitches its belt for the long pull ahead.

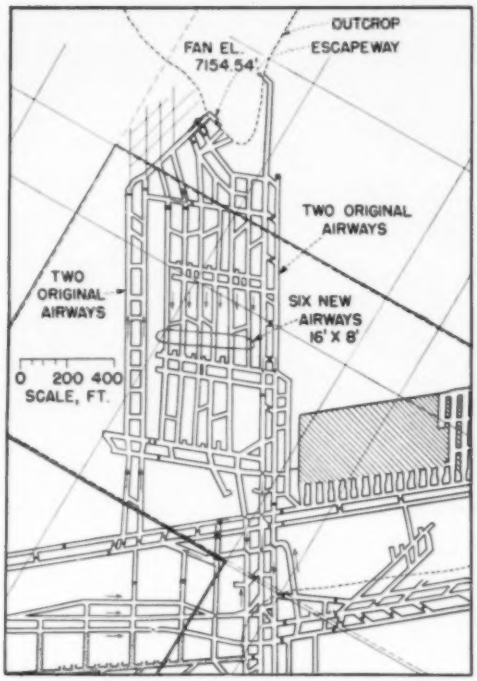
Other markers of the modernization program are a 2,000-ft haulage tunnel which will increase the main-haulage capacity of the mine and eliminate the existing slope and hoisting facilities, and an 8,900-ft main haulageway in the coal measures to link the mine with the new tunnel. Although opened in 1901, the mine has a life expectancy of about 100 yr, which makes the current program a major effort to achieve highest possible efficiency through the use of modern machines and methods and the construction of an up-to-date physical plant.

Operating officials charged with the responsibility of getting the job done include R. G. Heers, manager of mines; John Peperakis, assistant manager of mines; G. A. Farnsworth, superintendent, Mine No. 1; M. D. Ross, mining engineer and L. L. Alger, master mechanic. The up-dating efforts also include Sunnyside No. 2 mine, supervised by Tom McCourt, mine superintendent.

WORKING UPHILL AIRWAYS

Briefly, the steep-pitch mission of the continuous miners consisted of driving six airways to the outcrop through a block of coal which was left between two pairs of previously driven openings, thus providing four intakes and six returns over the shortest possible route to the surface. Field airshafts had to be ruled out because the cover is from 1,500 to 2,000 ft thick in the area where such shafts would have to be sunk.

In working up the pitch, the miners used the floor as a



SIX NEW AIRWAYS, splitting the block between four others, will require minimum maintenance since timbers need not be replaced.

surge bin and were accompanied by pick-up loading machines. Transportation was provided by shuttle cars, shaker conveyors and mine cars, which, in sequence, covered the entire route from the face to the tipple.

As shown in the accompanying diagram of the airways, progress was satisfactory in view of the steepness of the pitch and the delays encountered in assembling bolt-and-plank supports for the roof.

The equipment used on the job when both units worked included two Joy continuous miners, one a 4JCM-2G and the other a 4JCM-1AF, two 8-BU loading machines, two 10-SC shuttle cars and four Goodman G-20 shaker conveyors, each 250 ft long. Roof-bolt holes were drilled with an Ingersoll-Rand R-48 stoper and the wedge-type bolts were tightened with an I-R impact wrench. Compressed air was supplied by a new portable Gyra-Flo rotary compressor located on the surface near the opening of one of the original airways.

SHUTTLE CARS REPOWERED

Indicative of the steepness of the pitch is the fact that the shuttle cars had to be repowered with 15-hp traction motors in place of the original 10-hp units. Generally, the pitch at Sunnyside varies from 8½ to 12%, but near the outcrop, where the airways are driven, the gradient rapidly increases.

Each face crew included six men: the face boss, three operators (continuous miner, loading machine and shuttle car), and two men for supporting the roof. In addition, one man attended the loading point for both crews.

As to how the continuous miners came to be on hand when they were needed for this special detail can be determined from a short review of natural conditions and recent changes in mining methods at Sunnyside. The story of these recent changes is an object lesson in seizing new ideas and modern machines to counteract difficult mining conditions.

Operations are in the Lower Sunnyside seam, which averages 7 to 14 ft in thickness. It is separated from the upper seam by a rock strata from 2 to 40 ft in thickness which forms a weak roof, especially in the areas where the seams converge. In short, roof in Lower Sunnyside workings may be classified as notoriously bad.

In this newer portion of the mine, the main entry is parallel to the strike. At present, a set of dip entries are driven to a distance of about 3,400 ft down the pitch. Panel entries along the strike are turned right and left from the dip entries on 300 ft centers, and rooms 300 ft long are driven up the pitch from the panel entries.

The main entry approximately marks the dividing line between the steeply pitching and moderately pitching coal. In the dim past, much of the coal near the surface on the pitch side of the mains has been subjected to outcrop fires and is not suitable for mining. Therefore, the only reason for driving up this heavy pitch at present is to secure escapeways and ventilation openings to the outside.

Hoisting engines haul the mine cars out of the dip entries to the level motor road where locomotives take over for the haul to the tipple.

CONTROLLING THE ROOF

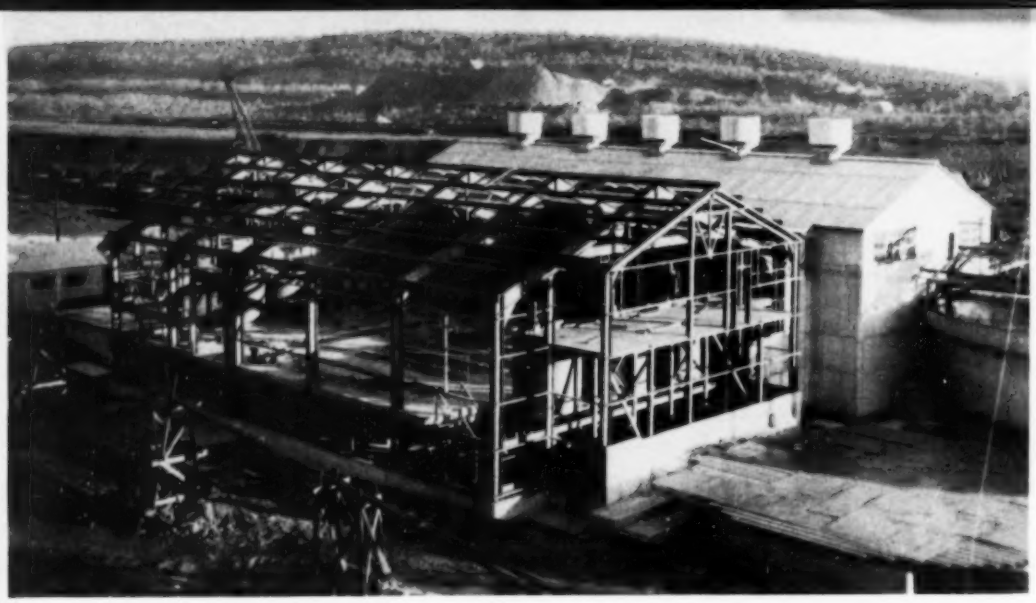
The nature of the roof always has governed the selection of machine types and the degree of mechanization to be employed at Sunnyside, and it always has imposed severe limitations on freedom of choice.

Earliest ventures into mechanical mining consisted of conveyors, followed by the introduction of loading machines to feed the conveyors. After World War II, the Kaiser interests made a close analysis of the job to be done and the newer machines available. The analysis showed that perhaps concentration of workings and off-track units could increase efficiency and productivity. To make the system work, however, timbering delays would have to be materially reduced. This was done by equipping the mining units with universal cutting machines, which would double as high-lifts in placing heavy collars against the roof in the high openings. In sections thus mechanized, productivity went up from 50 to 100%.

Then, in 1949, roof-bolting proved to be worth a trial, and subsequent studies and experiments showed that bolting would be helpful in controlling the troublesome roof. As pointed out by Mr. Peperakis (*Coal Age*, October 1950), haulage was improved and productive operating time for the machines began to rise as timbering delays were substantially reduced.

Sunnyside officials then turned to continuous mining to determine if that new and growing method of mining could be adapted to their operations. In the meantime, the increased operating time that resulted from early roof-bolting methods had been further increased by mechanizing the bolting work.

That was the situation in late 1950 when Mr. Heers decided that the new airways had better be started to insure adequate air for the growing mine. Recalling the obstacles offered by the steep pitch and the bad roof in driving the original four openings, it was thought that continuous miners and roof bolts should be used. If the pitch became too steep for the units, the airways would have to be driven with less mechanized equipment and the completion date extended. But the continuous miners proved satisfactory, and the new bolted openings provide maximum capacity since timbering no longer interferes with the flow of air.



LOCUST SUMMIT FLOTATION PLANT, soon to be doubled in size, recovers coal with . . .

Low-Cost "Matte" Flotation

Locust Summit Flotation Plant . . . A Thumbnail-Sketch Roundup

Location—Near Ashland, Pa., in Schuylkill County. The new plant is a fine-coal cleaning facility serving the Locust Summit central breaker on one shift per day and on the other two shifts reclaiming fines from slush deposits (estimated 10 million tons) which have accumulated during 22 yr of breaker operation at this location.

Process—"Matte" flotation in 24 Lasseter-type cells in two stages. Primary flotation in three 6-cell banks produces the final product; secondary flotation in three 2-cell banks produces final refuse and scavenged middlings product, which is returned to the primary circuit for further cleaning. The matte produced in the double-discharged cells has a high solids-density, about 50%, a factor which eliminates filtering and facilitates dewatering by natural drainage.

Sizes cleaned—8x200 mesh. The values in the breaker water and in the slush deposits are contained in this size range. Oversize is scalped in a screening plant when the slush deposits are being worked, undersize is removed in a 40-ft hydroclassifier and both are discarded. The bottom size, 200 mesh, was chosen after exhaustive tests proved that finer material could be economically rejected. Furthermore, the elimination of such fines from the final product and the high proportion of plus 28-mesh coal in the product (about 22.2%) also preclude the need for filters and driers.

Product'on—About 450 tons per shift, present average. From May 1, 1950, when the plant went into operation, until May 1, 1952, 283,160 tons of flotation coal were produced with an average ash content of from 11.5 to 13.5% and an average moisture content of from 12 to 15%, including 3% inherent, after natural drainage from the railroad cars. The plant worked single shifts per day until November, 1950, double shifts from that time until February, 1952, and triple shifts thereafter.

Personnel—4 men per shift, inside the plant. The operating force includes a shift boss; 3 men in the plant to monitor flotation machines, feed pumps and reagent feeders; 1 man in the plant to oversee the operation of the loading belt and the refuse and recirculation pumps; one man on the water-clarification system and 2 men to clean, pack, load and run the cars. Up to January 1, 1952, the operators had expended 39,322 man hr, including all maintenance and an extra shift per week on the water-clarification system, without lost-time injury.

Power—2,800 kwh per shift, average power consumption. The total connected load is 304 hp for 94 motors. Power at 440 v, AC, is provided for the larger motors, at 220 v for plant lighting and floodlighting of the loading area and at 110 v for fractional horsepower motors and hand tools. The motors are not interlocked, but are controlled from three-push-button-equipped control centers. The motors and controls are numbered, and motors visible from the control station can be stopped from both the control station and the motor location. They can be started only from the control station, but only after the stop has been reset at the motor location. This control arrangement is reversed for motors not visible from the control station. The stop and reset buttons prevent anyone from inadvertently starting a motor after someone has stopped it in an emergency and is working on the equipment.

Product uses—Every ton in new markets. The greatest single use for Locust Summit flotation coal is as fuel for pulverized-coal burning units in a power-generating station. However, it also is shipped as far as Tennessee for use in sintering metallic ores, and it is used for briquetting.

Plant performance—Operators and consumers of the product are satisfied. As evidence of the fact, Philadelphia & Reading now is building a twin installation which will double the company's output of flotation coal.

Philadelphia & Reading's company-developed process cleans a wide "natural range" of sizes. The benefits are, for the producer, a simplified process in which car loading directly follows flotation; and for the consumer, a clean, graded product which is relatively easy to unload and grind because of its high proportion of coarse material.

How the Flotation Cells Operate

THE LASSETER-TYPE CELLS are a relatively recent development. Although patented in 1940, they were first used in this new plant at Locust Summit because the war slowed down pilot-plant research and the production of such cells in quantity. Now known as Denver "Sub-A" Lassetertype cells, the new units operate on the principle of floating a relatively large particle through the combined action of many small bubbles, rather than raising a number of fine particles through the action of a large bubble. The resulting product appears at the surface of the cell as a relatively dry matte containing a high proportion of coarse particles, and is swept into launders at both ends of the unit by a series of slotted stainless-steel rakes mounted on sprocket-driven chains. The slots in the rakes permit initial dewatering of the matte to about 50% solids by weight.

The body of the cell includes an agitation and aeration zone at the bottom, a relatively quiet teeter zone where particles are classified and separated, a flotation zone at the top where the matte collects and a concentrate removal zone. The material in the cell is agitated by a receded-disk impeller driven by its own 7½-hp motor through V belts at the low peripheral speed of 1,700 fpm. Within individual cells, middlings may be drawn from the teeter zone and returned to the agitation zone.

Each cell has a volume of 100 cu ft and a flotation area of 36 sq ft, and as many cells as are required may be installed in series on the same horizontal level.

How the Coal Is Processed

The processing duties begin at a 40-ft Wemco hydroclassifier which is an integral part of the flotation plant, but this hydroclassifier may be fed from either of two sources, as noted in the thumbnail sketch.

During the one shift each day when the central breaker is operating, the hydroclassifier receives the underflow of a 150-ft Dorr Thickener which is an element of the breaker circuits to provide clarified make-up water for the breaker equipment. On the other two shifts, material from the slush deposits is trucked to an auxiliary plant where it is screened to remove oversize, pulped and then pumped to the 40-ft hydroclassifier. Feed from either source enters the hydroclassifier at about 30% solids and from 28 to 33% ash at a rate of about 110 tph of dry solids.

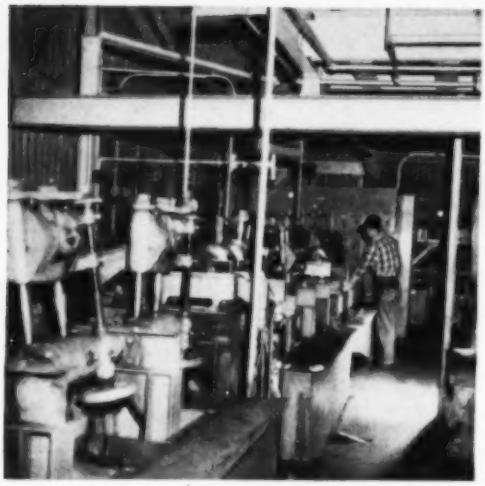
The underflow of the 40-ft hydroclassifier, which is flotation feed, is raised to the plant by three 6-in Denver Triplex adjustable-stroke diaphragm pumps, each of which discharges by gravity to a separate 8x8-ft Denver Super Agitator and Conditioner. Each pump and each of the three conditioners handles about 30 tph at a density of 40%.

In the conditioners, kerosene is added and the pulp is conditioned for about 8 min. From 4 to 5 lb of kerosene per ton of feed is required to properly treat the material which comes from a number of different veins. This amount of kerosene results in slight over-oiling. Therefore, the ash content of the product is controlled by careful metering of the frothing reagent, amyl-ethyl alcohol, which is fed into the first and fifth cells in each of the primary trains and into the first cell in each of the secondary trains. Total frother consumption is about ¼ lb per ton of feed.

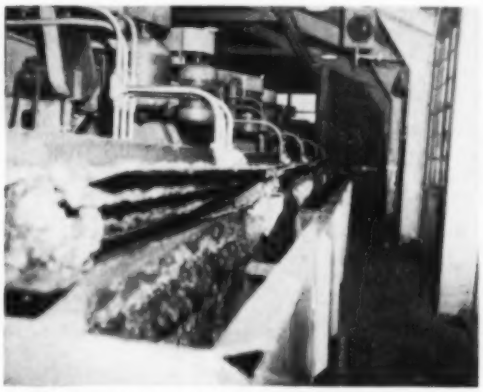
Separation of the final product in the primary cells requires about an-

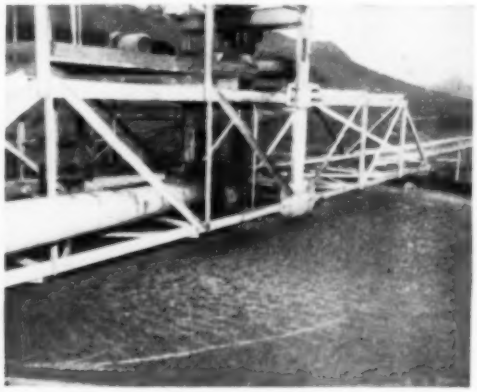
"SLUSH DEPOSITS" and breaker water . . .

FEED these effective flotation cells.

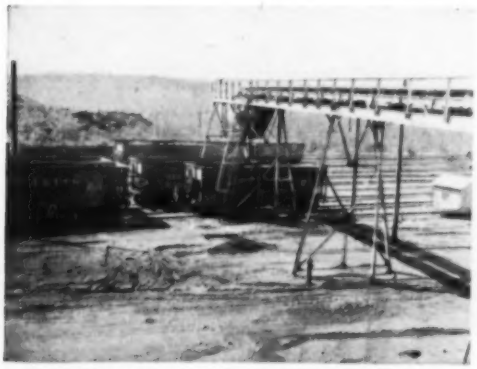


PLANT FEED, the underflow of a 40-ft hydroclassifier, is raised into the plant by three triplex diaphragm pumps (left) and discharged to three 8x8-ft preflotation conditioners (right), where kerosene is added.



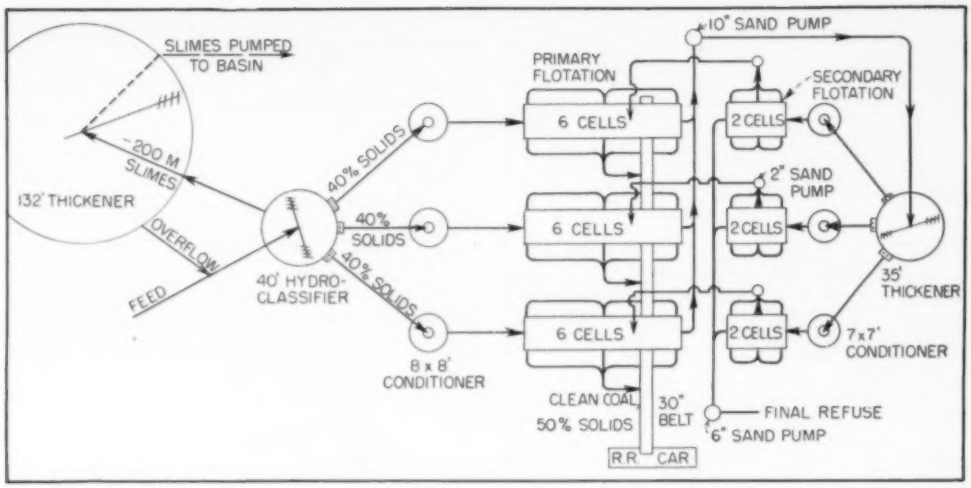


PRIMARY FLOTATION CELLS (left) produce the final product. Primary tailings are pumped to 35-ft thickener (right), which provides makeup water (overflow) and feed for secondary flotation (underflow).



FINAL PRODUCT, matte from the primary cells, is transported to railroad cars on 30-in belt conveyor.

BELT CONVEYOR discharges through chutes, excess water drains through bottom of car or is siphoned from top.



SIMPLIFIED FLOW CIRCUITS are characteristic of Locust Summit's neat layout in both plant and equipment.

other 8 min. This matte, raked from both ends of each primary cell, drops into collecting launders which discharge to a 30-in car-loading belt conveyor.

This is the end of P&R's foreshortened flotation process, as far as the coal is concerned. In the cars, natural drainage reduces the moisture content to the 12-15% range, as mentioned. A combination of the reagents used in the cells, the coarse material in the product, and siphoning free water from the top of the coal as loading proceeds assists in dewatering. Freezing has not been a great problem, except when cars have been unduly delayed in transit.

At the power station where the coal is used, facilities are designed to handle coal of this moisture content. A rotary dump unloads the cars, and it is reported that the wide spread among the size fractions facilitates multistage grinding.

Tailings from the primary cells, carrying from 12 to 16% solids, flow by gravity to a sump where they are picked up by a 1,200-gpm Barrett-Haentjens deepwell pump which discharges to a 35-ft Wemco thickener. The overflow of this thickener containing a large portion of the original reagents, is returned to the plant to be used as makeup water in the conditioners and flotation cells, while the underflow is pumped by three 6-in Denver Duplex diaphragm pumps to three 7x7-ft conditioners for a 12-min treatment with a small amount of kerosene prior to secondary flotation in other cells.

The concentrate from the three trains of secondary cells drops into three separate sumps, from each of which a 2-in Wemco sand pump returns this secondary product to the fifth cell in the corresponding train of primary cells. Tailings of the secondary cells, the final plant refuse, drop into a sump and are pumped from there to a settling basin about 4,000 ft away by a 650-gpm Barrett-Haentjens deepwell pump.

How Process Water Is Provided

Design of the water-handling system at the flotation plant is based on three considerations, as follows:

1. The plant feed coming from the 150-ft thickener at the breaker must be deslimed. About 25% of the solids in the feed water consists of minus 200-mesh high-ash fines, about 80% of which should be removed to promote efficient flotation. The 40-ft hydroclassifier was chosen to do this job.

2. But in the hydroclassifier, the separated fines are removed in 3,200 gpm of water in the overflow. Balancing this overflow against the hydroclassifier feed from the breaker thickener, it was evident that 2,400 gpm would be required as makeup water for the 40-ft unit plus some 400 gpm of clear water for use in the plant. After careful deliberation, a 132-ft Hardinge thickener was selected as the best unit to receive the overflow of the hydroclassifier, clarify the water and return the necessary clean makeup water to the hydroclassifier.

3. How to dispose of the slimes removed in the hydroclassifier is the final consideration. This slime appears as the underflow of the 132-ft thickener, and is pumped by a 4-in sand pump with 450 gpm of water to a settling basin adjacent to the one that receives the final plant refuse. Discharge water from both basins complies with Pennsylvania's "clean streams" law.

The selection of the 132-ft thickener was the culmination of a period of intensive study among Philadelphia & Reading engineers, principally W. C. Muehlhof, chief engineer, and H. R. Hagen, mechanical engineer, who have attended the conception, birth and early years of this striking new plant.

In providing the necessary water for the hydroclassifier, there was the possibility of neutralizing water from one of the collieries and pumping it 9,000 ft with heavy-duty pumps from the mine to the plant. But the initial cost of the installation would have been $190,000, and annual operating costs would have been $22,250 for single-shift operation and linearly higher for multiple shifts. As mentioned, the plant now runs three shifts per day.

Another possibility was a 90-ft thickener ($65,000 estimated cost), which would have had adequate capacity for the initial plant but no reserve for future expansion.

The 132-ft unit ($76,000) operates at an annual cost of $7,425 per shift. It has a capacity of 990,000 gal, about double that of a 90-ft unit, and will

132-FT THICKENER, with monolithic concrete tank wall, settles out minus 200-mesh slime from classifier overflow.

TWO VERTICAL PUMPS return over-flow of thickener to hydroclassifier to adjust solid-water ratio of feed.

serve the additional 40-ft hydroclassifier that will be part of the new twin plant now under construction.

In this instance, overdesigning paid off, since it was based on close analysis of costs and a canny look into the future.

Noteworthy features of the thickener are (1) a monolithic concrete sidewall and (2) the Hardinge "auto-raise" arrangement which lifts the scraping mechanism out of the sediment in the event of an overload.

The reinforced sidewall, 12 in thick and 7 ft 3 in high, was raised by a continuous pour of concrete. There are no expansion joints, and operation through two winters and three summers has not resulted in detectable stresses. The form for the 5-ft-diameter 24-ft-high center post is a cylinder of ¼-in steel plate which remains in place. This idea saved some money by eliminating the labor and materials that would have been required to erect and remove wood forms. Furthermore, the steel adds strength to the post.

The auto-raise setup for protecting the scraper mechanism is as follows: The 5-hp drive motor turns a pair of drive brackets which are inclined opposite to the direction of rotation. Drive rollers on the supporting structure of the scraper are pushed by these inclined brackets. If sediment builds up excessively it offers resistance to the scraper, thus causing the rollers to ride up the inclined brackets and to lift the scraper out of the congestion until it clears. At a predetermined height, the rollers close an alarm circuit to warn the operator of the overloaded condition. At the limit of travel of the rollers on the brackets, the drive motor is disconnected. On two occasions since the plant has been operating the auto-raise assembly has prevented damage to the equipment. Such damage in a large thickener could result in interrupted operations and the probable necessity of removing the water from the tank to make repairs. This would necessitate a lengthy shutdown of the plant.

In illustrating the effectiveness of clarification in the thickener, Mr. Hagen reports that a heavyweight carp waxed fat and happy in the tank for several months.

The building which houses the flotation equipment is a 96x52-ft McCloskey-type structure. The roof structure in such a building is devoid of supporting trusses in favor of beefed-up purlins and rafters. The result is either more clear head room or lower building height, with P&R engineers deciding to compromise with a building 21 ft high at the eaves.

In giving another reason for this construction, Mr. Hagen points out that the central breaker, the slush reserves and the new plant have a long life ahead of them. "Who knows what form coal-cleaning processes will take 30 yr hence? With no columns to worry about and plenty of head room, we can make changes or add improvements with the least possible trouble," Mr. Hagen says.

The Lasseter flotation process and the new plant are tangible results of P&R's company-sponsored research, which continues under the present management: E. G. Fox, president; G. A. Roos, vice president in charge of operations; and George J. Clarke, general manager. Messrs. Hagen and Muehlhof were in charge of engineering, as mentioned, assisted by H. H. Martin, assistant engineer. Edward Williams, superintendent, Locust Summit Central Breaker, heads up operations at the plant, which is part of the company's Ashland division, headed by C. J. Decker, division superintendent.

Performance Data

40-FT. CLASSIFIER

	Feed	Under-flow	Over-flow
Water, gpm	3,780	980	2,800
Solids, pct	31.40-12.33	37.64	3.48
Solids, tph	116.58	92.22	24.36
Ash, pct	27.25	24.45	41.69
Mesh (Tyler):			
8	0.2	0.2	.....
10	0.8	0.6	.....
14	3.0	2.8	.....
20	7.2	7.6	.....
28	12.2	13.4	0.2
35	15.0	17.6	0.5
48	14.6	18.2	0.5
65	12.2	15.6	1.7
100	9.2	11.6	3.4
150	6.2	6.6	4.8
200	2.8	2.2	2.5
—200	16.6	3.6	86.4
Total	100.0	100.0	100.0

PRIMARY FLOTATION

	Feed	Coal	Refuse
Water, gpm	970	506	620
Solids, pct	34.17	50.14	10.88
Solids, tph, dry	83	65.1	17.9
Ash, pct	24-30	11.5-13.5	59-65
Mesh (Tyler)			
8	1.2	0.2	0.2
10	1.2	0.6	0.6
14	4.0	3.0	3.0
20	7.4	6.0	5.2
28	12.6	12.4	7.2
35	15.2	15.6	9.0
48	16.6	17.4	14.4
65	14.4	15.2	17.0
100	11.8	12.4	13.6
150	7.2	7.6	9.4
200	3.4	3.4	5.8
—200	5.0	6.2	14.6
Total	100.0	100.0	100.0

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Foremen's Forum

Safety, efficiency and production—the "undodgable" among . . .

Supervisors' Responsibilities

Like the Three Musketeers, safety, efficiency and production go hand-in-glove as an effective team. Promoting one and neglecting the others can make the boss's job an impossible chore.

By HARRY NORTHOVER, Washington, Pa.

SAFETY, EFFICIENCY AND PRODUCTION are leading factors keeping us in the coal business—one without the others is fruitless. I believe we all know that discipline is the foundation of safety, and by discipline I do not mean making rules and failing to obey them nor enforcing them on some employees and not on others. To do so merely tempts men to disobey.

Safety has something of a personal nature. It is personal insurance. To be safe one must constantly think and act in a safe manner. As supervisors, it is entirely in our hands that the quality of our safety record will be no better than the effort we put into it. Stopping accidents is now more vital than ever because of conditions that exist. We must be firm and we must have the backbone to enforce good discipline. Safetywise, it is our duty to know how and why when instructing men in their jobs, especially new men.

KNOW HOW, THEN TELL OTHERS

All supervisors and others in authority must know the rules and regulations of their mines and must assist newer employees by talking to them from time to time on subjects relating to their jobs. For example, a faceboss might talk to his men for 15 min. at lunchtime on important safety issues, such as, haulage, timbering, trackwork, loading, cutting and so on. The faceboss is the key figure. Any company which is known as a safe place to work gains a reputation for being a good place to work.

Machinery breakdowns and accidents can be prevented by frequent inspections and by replacing worn parts before they fail. When a dangerous condition arises, it should be taken care of immediately.

Cleanliness and good ventilation are of great importance. All working sections should be kept neat and clean, especially along haulageways and manways. Good ventilation results in a minimum of explosive or noxious gases, thus eliminating the health and fire hazards that would result from their presence in the workings. Dry coal dust implies the danger of dust explosions unless steps are taken to remove as much of the dust as possible and to render harmless the remainder by the application of moisture or rock dust. Good ventilation also means plenty of fresh air properly conducted with a minimum of leakage to the working faces.

Rock dusting should be done regularly on top, bottom and sides and maintained so that the incombustible content of the lodging dust shall not be less than 65%. Furthermore, rock dusting adds to the illumination of the mine.

In a few words, a great safety adage is: "Be where we ought to be when we ought to be there, and do what we ought to do when we ought to do it."

VALUE OF DEPENDABILITY

Dependability promotes efficiency. Of all the qualities of character, none is more important than dependability. Many a man just misses being what he might have been through lack of this one characteristic. He may be brilliant, talented, witty and considerate, but he will advance little without dependability. It isn't a question of what one will do, but a question of when he will do it. It isn't a question of what one is able to do, but of what he does. It isn't a question of can he do a job, but will he do it.

Young supervisors starting out, take note: Dependability *is* very important. Those who are dependable may not as yet

A Creed for Living

By LYNN TROVILLION, Division Superintendent, Peabody Coal Co.

Each day I try . . .

To admit that being human I am bound to make mistakes, but to make as few as possible and to try to avoid making the same mistake twice;

To never be too enthused over success or too dejected because of failure, for both will pass away;

To consider the feelings of other folks as I should like to have them consider mine;

To go my way quietly and humbly, and not worry too much about mysteries I cannot explain;

To do my best here and now, and let the future take care of itself;

To refrain from passing the buck, to take deserved blame though the heavens fall, and never to steal credit due another;

To share my courage and happiness with others, and keep my fears, heartaches and disappointments to myself;

To meet all the common experiences of human life bravely and to so live that when the Great Caravan called Death draws up and announces this earthly visit complete, I can leave without fear and trembling;

To admit it when folks tell me I fail to live up to my own philosophy of life, but to keep trying nevertheless.

—*Peabody People*

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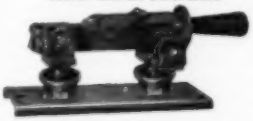

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have found out how far it will take you, or how far back it will leave you if you lack it. So, if you are a person who can be depended upon, you have little to worry about. Remember, the little man who wasn't there isn't worth much to anyone.

PRODUCTION BOTTLENECKS

With regard to production, we must not be bottlenecks. We have seen this happen: A man gets an idea and decides to do something. He starts out with energy and enthusiasm, then suddenly comes to the end of his rope with a sharp, sudden jerk. This is often the case with new men. On the other hand, very able men sometimes seem to forget that other men also are able. There are those who have many elements of greatness, but who seem to lack that one quality of trusting other men to make decisions themselves. In either instance, no matter how able a man may be, he can become a bottleneck.

Then, a man may have everything but character. He is like steel without strength, sugar without sweetness or water that isn't wet. A fellow without character is like a bridge that buckles. When engineers build bridges, they not only build them strong enough for the normal load, but strong enough to carry the unforeseen loads, the unexpected impacts. So when men are trusted in positions of responsibility, we need to know not only what they will do under normal conditions but also what they will do under pressure.

HIGH-GEAR PRODUCTION

Having achieved safety and efficiency, production will automatically roll along in high gear. To produce consistently, the supervisory force must cooperate collectively. Whether in two or three shifts, the two or three bosses should work as one, with no buck-passing or alibis. If they do otherwise, production will decrease and costs will rise. And advance planning is one of the greatest factors in efficient production.

Supervisors often are faced with the question, "How can I get the fellows on my section interested in production?" For example, Jim Cowie said to his superintendent, "I am doing all I can but my production still is too low."

"What have you done?"

"Well, we do this and we do that. I have been checking up on other sections and they are doing better than my section," Jim said.

"That sounds pretty good as far as you have gone, Jim. Why not have a weekly production report tacked on a bulletin board in your section?" asked the superintendent. "From this report you can point out the low producers to your men. You, as one. Ask each man what can be done to produce more and whether he has improvements in mind. It may sound like so much hooey, but to get people interested in something you have to give them a target to shoot at."

In production work, one must have the ability to look ahead, to plan and to prepare for abnormal as well as normal situations. This is a prerequisite of sound and able supervision. No supervisor can afford to neglect such foresightedness. Each person on the job must think and plan to save. It is a recognized fact that more supplies on a job than are needed leads to waste.

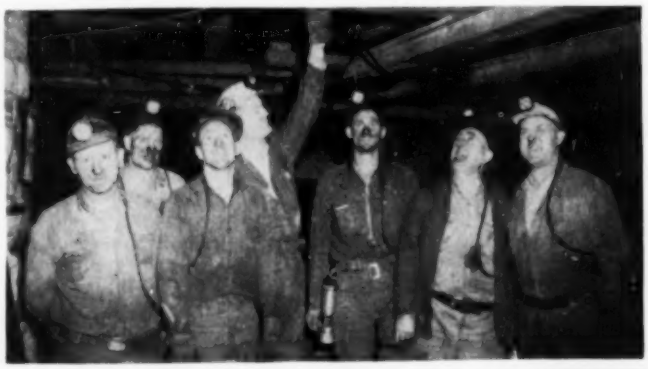
Finally, it is essential that the right hand knows what the left hand is doing. This eliminates delays and confusion.

For the Christmas Season . . .

We wish you a full measure of the Season's Joys, including a Happy Christmas Morning with your loved ones and the inner pleasure that comes with observing the Birthday of the King.

And for the New Year . . .

May you keep all your old friends, make a lot of new friends, and come to the end of 1953 happy and healthy and with the satisfying knowledge that another year has been well lived.



COAL MEN ON THE JOB . . .

Stotesbury No. 8 mine, Coal Div., Eastern Gas & Fuel Associates, Stotesbury, W. Va.

TOP PHOTO: L. Necessary (left), rock-loader operator; C. W. Wood, brakeman; C. Polk, motorman; C. O. Carman, superintendent; C. L. Wills, section foreman; J. W. Richardson, plant inspector; and S. J. Bonds, rock foreman.

LOWER PHOTO: W. E. Huguenot (standing, left), general mine foreman; Pete Lopez, Fred Ritter and George Niday, section foremen; C. L. Wills, timber foreman; Russell Shumate and Hurl Harper, section foremen; Golen Eanes, weighboss; Grat Shumate (seated, left), section foreman; Jim McQuade, inside electrical foreman; S. J. Bonds, rock foreman; Louis Lopez, section foreman; Houston Hall, ventilation foreman; Glen Nelson, rock foreman; F. A. Ritch (kneeling, left), assistant general mine foreman; Aubrey Bryant, section foreman; Hubert Farthing, transportation foreman; Leonard Foley, section foreman.

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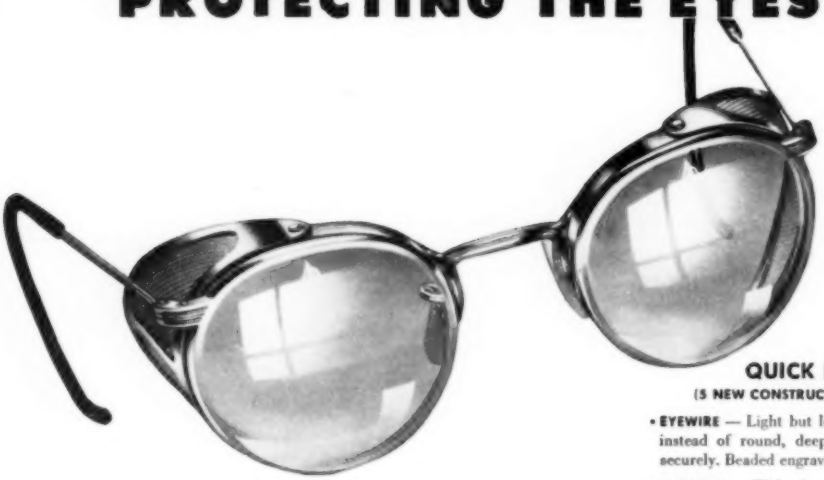

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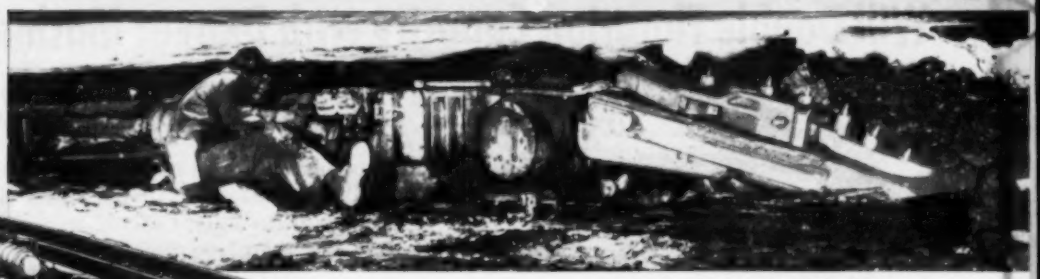

Joy 20-BU-1 loader and 8-SC Shuttle Car in 30" coal

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Construction work at the Locust Summit Plant of The Philadelphia and Reading Coal and Iron Company will double the coarse coal flotation capacity. The Philadelphia and Reading Coal and Iron Company picked Denver "Sub-A" (Lasseter Type) Flotation Machines for their first coal flotation operation, in full, three-shift production since February, 1952. Again, Denver "Sub-A" (Lasseter Type) Flotation Machines will be used for the new addition.

The Philadelphia and Reading Coal and Iron Co. Will Double Flotation Capacity with Denver Machines

The Philadelphia and Reading Coal and Iron Company will have the largest coarse coal flotation capacity in the world upon completion of present construction work at the Locust Summit Plant, near Ashland, Pa. The addition of 24 new Denver "Sub-A" (Lasseter Type) Flotation Machines will more than double the plant's present capacity of a-ton-a-minute.

Twenty-four Denver "Sub-A" (Lasseter Type) Flotation Machines are already operating three shifts a day. One of the major factors in the success of this operation has been the economy and high recovery from these Denver Flotation Machines.

The first Lasseter Type Denver "Sub-A" Flotation Machines were installed in the Locust Summit Plant in 1950. Commercial production was reached in May, 1950; and between that time and February, 1951, 1,643 railroad cars of coal were produced in 112 single shifts and 69 double shifts.

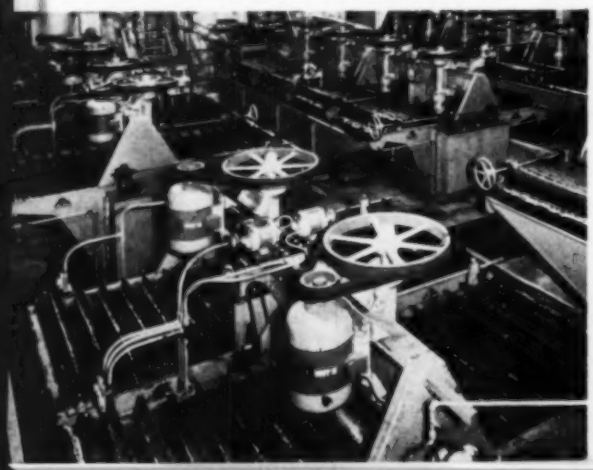
LABORATORY TESTS DETERMINE PROFITS

After laboratory and pilot plant testing, Denver "Sub-A" (Lasseter Type) Flotation Machines were selected. These machines discharge an appreciable quantity of +28 mesh material with sizes as large as 8 mesh in concentrate, or product.

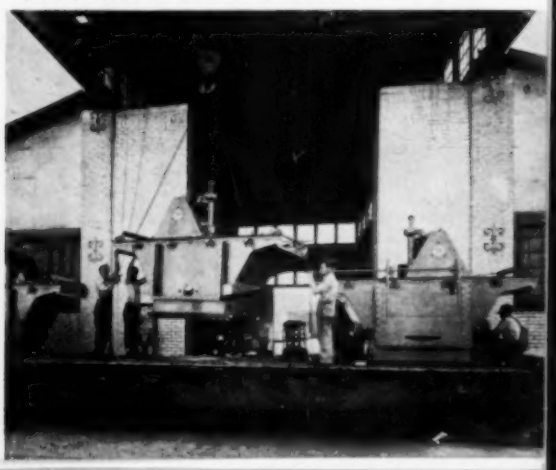
10 MILLION TON SURFACE RESERVE

Concentrate is delivered by gravity to a belt conveyor which takes the concentrate to a loading chute to railroad cars. Moisture in the product, as loaded, is

These Denver "Sub-A" (Lasseter Type) Flotation Machines, now operating in the Locust Summit Plant, discharge minus 10 mesh floated coal—ash of 24-30% in the feed is reduced to 11.5-13.5% ash in the concentrates.



Denver Equipment Company men load part of the shipment of new Denver "Sub-A" (Lasseter Type) Flotation Machines for The Philadelphia and Reading Coal and Iron Company. The new expansion program will make this the highest capacity coal flotation installation in the world.



reduced by siphoning free water and by natural gravity drainage to an end result of 12 to 15 percent.

When the adjacent Locust Summit Central Breaker is operating, feed for the flotation plant is obtained from breaker discharge. When the breaker is not operating, feed for the flotation plant is obtained from slush deposits which are estimated to contain more than 10 million tons of material.

A-TON-A-MINUTE RECOVERED

During the first year of intermittent operation, over 100,000 tons of marketable, low ash coal were produced. Present production is between 1,100 and 1,200 tons per triple shift.

OPERATING RESULTS

Typical operating results in the primary flotation circuit are as follows:

	Feed	Coal	Refuse
GPM	970	506	620
Percent Solids	34.17	50.14	10.88
T.P.H. (dry weight)	83	65.1	17.9
Percent Ash	24-30	11.5-13.5	59-65

Find out how you can increase your profits with Denver "Sub-A" Flotation for your coal fines – end stream polution and big wastes. Write for free bulletin which gives complete details, or phone DECO for immediate engineering recommendations. Get a low ash, high market value product with Denver "Sub-A" (Lasseter Type) Flotation Machines – complete equipment for your coal flotation plant – one responsibility, one source.

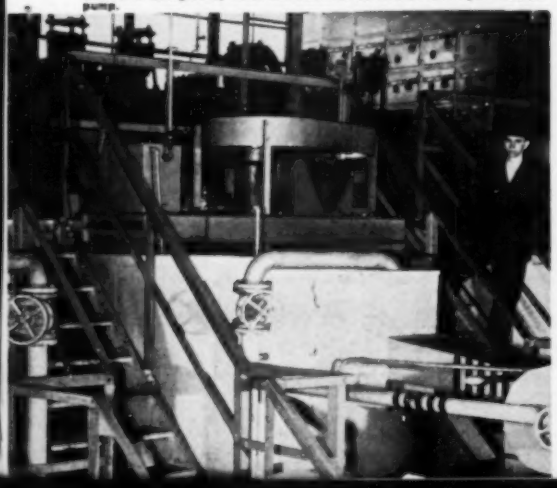
Our 25th year of Flotation Engineering

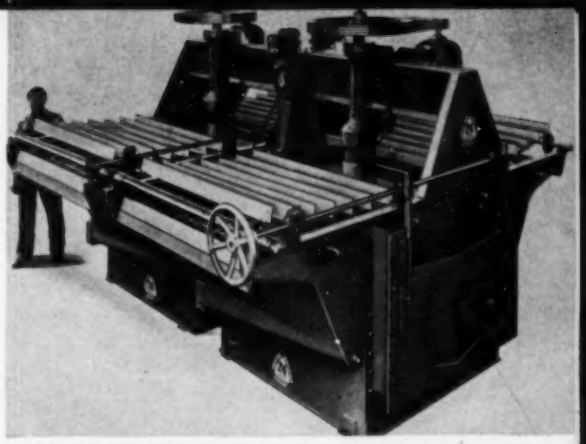
DENVER EQUIPMENT CO.

1400 17TH STREET

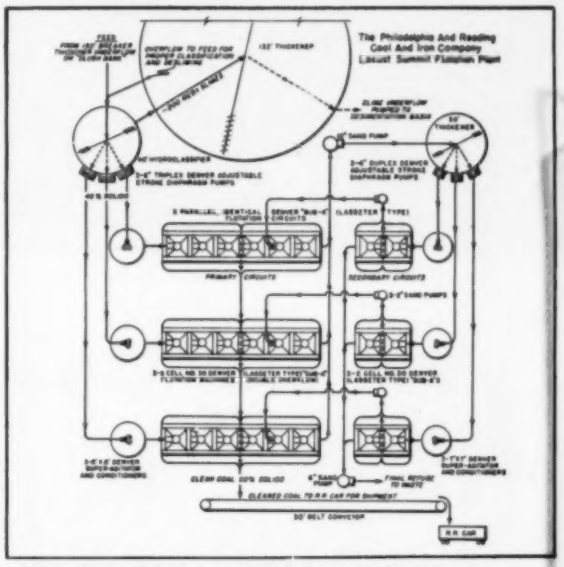
DENVER, COLORADO

8' x 8' Denver Super-Agitators and Conditioners thoroughly disperse the kerosene promoter throughout the pulp before feeding to the primary flotation circuit. Three Triplex 6" Denver Adjustable Stroke Diaphragm Pumps (shown in background) meter underflow at 30 tons of solids per hour, per pump.





With the Denver "Sub-A" (Lasseter Type) Flotation Machines, slotted, stainless steel rubes discharge a heavy matte of clean coal, which is carried directly to railroad cars. On initial operation, 112 single shifts and 69 double shifts at this plant produced 1,643 carloads of coal formerly wasted in slush banks.



Laboratory Denver "Sub-A" (Lasseter Type) Flotation Machine cells are available for on-the-job pilot testing. Ask DECO about testing work in your own plant—to see how much you can increase profits with flotation.

DENVER EQUIPMENT CO
1400 17th Street, Denver 17 Colorado

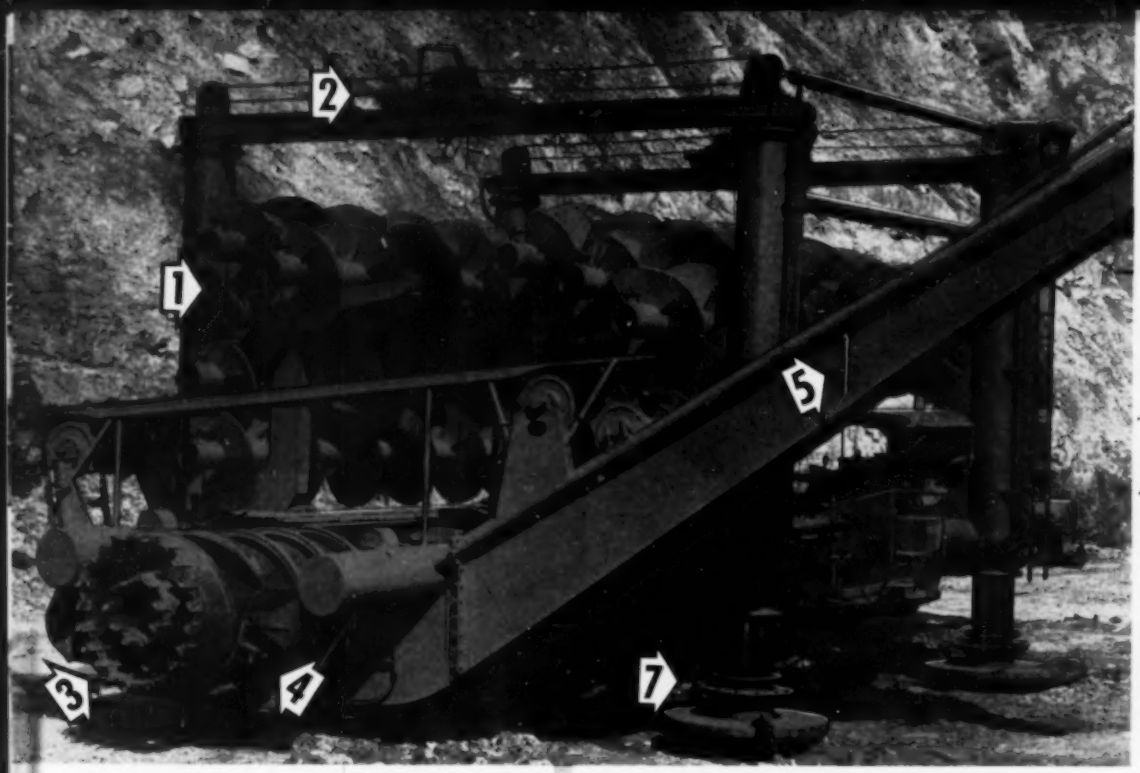
Please send me a Deco Engineering Bulletin on the Locust Summit Plant, and Deco Engineering Bulletins on other coal flotation plants.

NAME_____

COMPANY_____ TITLE_____

ADDRESS_____

CITY AND STATE_____



More Coal

regardless of overburden...

Recovers up to 700 tons per shift where overburden removal is too costly

COMPTON

When normal strip mining reaches an economical limit--where overburden removal is prohibitive--the Compton Auger paves the way to rapid high wall coal recovery at minimum cost. With proper planning, a practical 70% recovery is possible up to a depth of 200 feet from the high wall face.

Easily operated and low in maintenance cost, the Compton Auger is high in output . . . actual operations have proven up to 700 tons of clean, lumpy coal per normal shift with a maximum crew of 4 men.

The Compton Auger means increased production at lower cost . . . higher product quality through selective mining. Plan today to profitably extend your present operations or future developments with the use of Compton Augers.

DESIGNED TO CUT OPERATION TIME!

The Compton Coal Auger is self-contained . . . no extra parts to be moved . . . no loose parts to be handled when the unit is ready to move and begin operation.

1. Auger sections conveniently racked at each side of the frame ready for transfer to operating position.
2. Hydraulically controlled, synchronized winches for handling auger sections.
3. Auger section can be placed in operating position in a matter of seconds.
4. Hydraulically operated pilot pan eliminates spillage between the machine and high wall.
5. Compton elevating conveyor is an integral part of the machine.
6. Hydraulically controlled, swivelling discharge turret chute assures uniform trimming of trucks.
7. Hydraulic jack legs with self-leveling pontoons that afford better floatation and allow drilling up to 200 ft. or more in depth without misalignment.

SPECIFICATIONS

Model 42

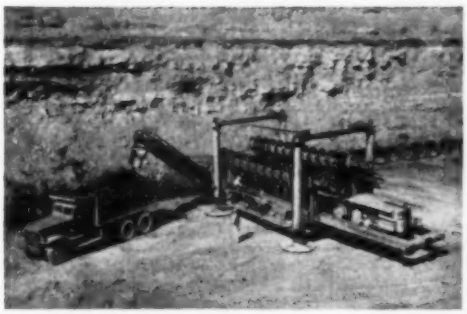
Length: 42 ft. Weight: Approx. 33 T.
Carries nine 21 ft. auger sections.
Required pit width: 45 ft. minimum.
Power: 225 hp Diesel engine.
Hydraulic frame jack lift: 66 inches.
Auger Diameters: 48 inch to 30 inch.
Possible drilling depth: 189 ft.

Model 56

Length: 56 ft. Weight: Approx. 50 T.
Carries six 34 ft. auger sections.
Required pit width: 60 ft. minimum.
Power: 300 hp Diesel engine.
Hydraulic frame jacklift: 66 inches.
Auger Diameters: 52 inch to 30 inch.
Possible drilling depth: 204 ft.

Hydraulic frame jack lift permits drilling of single holes or overlapping holes.

Self Contained Coal Auger



In actual operation, the location of hydraulically-operated turret chute provides two-way loading approach for trucks. Truck maneuvering time is minimized . . . trucks are trimmed to full load without spillage.

NOW—Latest Development in Auger Cutting Heads—A non-clogging head with built-in spider bearing assembly! This new cutter head increases production by drilling straighter holes with less frictional drag.

Consult a Compton Engineer for Details

Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 — PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

Operating Ideas

EMERGENCY CLAMP, designed by Trackman Andy Caroll (right), can be applied to a break in a rail in about 5 min to eliminate haulage delays.

Warwick Mine Fixes Broken Rails In a Hurry With Caroll Clamp

ANDREW CAROLL, trackman, Warwick No. 1 mine, Duquesne Light Co., Greensboro, Pa., came up with a good idea for making emergency repairs to broken rails in order to prevent transportation tie-ups, according to a letter from John Stephenson, mine superintendent at Warwick.

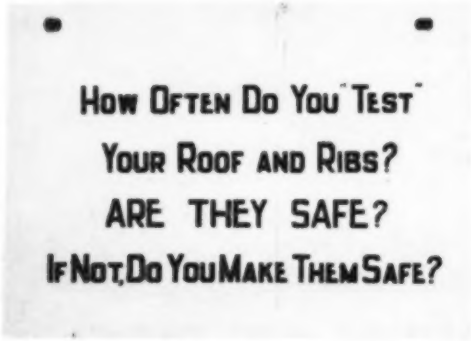
Heretofore, it was necessary for Mr. Caroll to secure a rail-bonding machine, drill three holes on each side of the break and attach the regular rail-junction angle plates. Sometimes an hour was consumed before this could be done, and transportation was delayed for that length of time, Mr. Stephenson writes.

To avoid this long delay, Mr. Caroll devised the emergency rail clamp which can be attached to the broken rail in less than 5 min, and it has been effective when kept in service for three or more days, or until a new rail can be installed.

The clamp consists of a ¼-in steel plate welded to ¾-in steel plate, as shown in the photos, and shaped in such fashion that it can be clamped onto the base of the rail. Two ½x6½-in bolts, 5 in apart, tighten the clamp onto the rail at the break. The clamp is 6 in long so that it can be installed between adjacent ties.

Warwick shopmen have made two sizes, for 40-lb and 70-lb rail, but it is possible to make one clamp adaptable to any size rail merely by feathering the inside edges of the base plate so that one edge will slide over the other.

Reminder Cards Reduce Injuries



TO HELP CUT ACCIDENTS from roof falls, K. T. Miller, safety engineer, The Hudson Coal Co., Scranton, Pa., designed a roof-notice card which is posted at miners' tool boxes, beginning of working places and at the working faces. They serve as a constant reminder to all personnel and keep them roof conscious.

There has been a marked improvement in accidents resulting from roof falls since the program began. For the 9-mo period following October, 1951, when they were first used, there were nine fewer fatal accidents and two less serious accidents than in the preceding period. Management is confident that the cards, plus added attention given to roof control by supervisors, are responsible for the improvement.

The drive to reduce accidents caused by roof falls is continuing, Mr. Miller states, and when the present supply is exhausted, color and wording will be changed to renew interest.

Angular Slotted Bits Drill Longer in Hard Roof

An angular slotted recess in the cutting edge of Kennametal Roof Drill Bits is a new design feature that greatly increases bit life, particularly in hard roof. It also reduces bit "wander". Operators have reported as much as 30 per cent longer footage in laminated sandstone with bits of the new design.

•

Web Core Breakers in Coal Drill Bits

A special feature of Kennametal Drill Bits in larger sizes is a web core breaker. It is incorporated into the body design and extends from the center of the bit to the base of the cutting edge. Being offset it breaks up solids that may be formed between the prongs through both pressure and impact exerted on them by the core breaker while drilling.

•

Machine Bit for Severe Conditions

Recently-developed Kennametal UR Bits feature a thick narrow cutting edge to offer great resistance to impact, and meet more severe conditions. While originally designed for continuous mining machines, it has since been adapted with equal success for service in conventional chain machines. Tip thicknesses employed are 3/16", 1/4", and 5/16" depending on conditions. Kennametal Catalog Supplement B-73 gives full particulars.

•

Hexagonal Shank Bits for Drilling Holes for 2-5/16" Diameter Tubes

Kennametal Hexagonal Shanks in sizes of 1 9/16" and 1 1/8" provide strong bit construction for drilling larger diameter blast holes. They also enable the bits to withstand heavier pressure when they are being used on large drills for drilling hard impurities.

Advertisement

Sloss-Sheffield Steel & Iron Co. Bessie Mines

Produce

28,054 TONS PER SET OF KENNAMETAL BITS

L. W. Byram, Mine Superintendent:
". . . Kennametal Bits cut 638 places without a bit being changed."

The above performance of Mining Machine Bits is the highest on record at the Bessie Mines of Sloss-Sheffield Steel & Iron Co., Birmingham, Alabama. Mine Superintendent L. W. Byram states, "Kennametal 'U' Bits, on a test, cut 638 places, or 28,054 tons of coal without a bit being changed." Before using Kennametal, bits were changed or spotted three to five times per shift, or the machine was stopped 100 to 200 times more often for bit maintenance. Performance like this explains why Kennametal Bits enable production increases to be made, while giving low actual bit cost and offering maximum ease of operation for both men and machines.

Special features of Kennametal that have enabled them to give the same superior performance in hundreds of other mines are superior bit design, highest quality tungsten-carbide, and on-the-job attention by competent Kennametal representatives. For the best in service, performance, efficiency, always specify Kennametal—the quality bit of the coal industry.

Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL®

Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

ELECTRICALLY-HELD PAWL engages gear tooth of main belt drive pulley when power fails and prevents runaway.

Electric Pawl Prevents Belt Runaway

TO AVOID COAL PILE-UPS, resulting from reversal and runaway of the slope belt, R. A. Cunningham, chief electrician and master mechanic, MacAlpin Coal Co., Raleigh County, West Virginia, devised and installed an electrically held pawl to engage the main gear on the head pulley when the power fails.

An electric coil, connected across one phase of the 100-hp 220-v drive motor, holds the pawl away from the clockwise-rotating gear. Power failure on the motor de-energizes the coil, permitting the compression coil springs to push the end of the pawl against the gear. The pawl engages a gear tooth whenever the gear periphery rotates counter clockwise 1½ in or less.

The 42-in slope belt is 627 ft long and elevates coal at 19 deg. Pile-ups occurred in the first years of operation when the band-type brake failed. No reversal or runaway has occurred since the pawl was installed 8 yr ago.

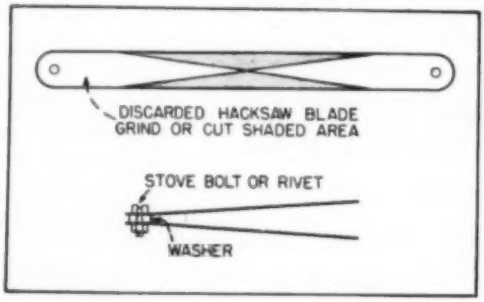
TRANSLUCENT PLASTIC GLASS WINDOWS eliminate breakage, cleaning and glare in the new shop and storeroom.

Mine Uses Unbreakable Plastic Glass

INSTALLATION of new translucent plastic glass at the new Allen mine of the Colorado Fuel & Iron Corp., Pueblo, Colo., has eliminated all worries about glass breakage, glass cleaning and sun glare. New forest green skylights, made of corrugated fiberglass and known as Corrulux, provide restful diffused light in all mechanical buildings and at the same time conduct 40% less heat than ordinary glass.

The panels, weighing only 9 oz per sq ft, can be nailed, hammered or drilled like wood. They come in coral, green, blue and yellow colors.

"Homemade" Tweezers for Tight Spots



TWEEZERS, made from a discarded hacksaw blade, speed electrical maintenance work at The New River Co., Harry Lainer, Summerlee, W. Va., night electrician helper, reports. The tool is used to put screws in leads and switches in Jeffrey and Chicago Pneumatic coal drills. Confined working space made it difficult to perform this operation without a tool so Mr. Lainer spent 10 min making a pair of tweezers, now a standard shop tool.

COAL AGE will gladly pay you $10 or more for each "Operating Ideas" you've successfully put to work at your operation, if acceptable for publication. Just write The Editor, COAL AGE, 330 W. 42 St., New York 36.

HAULAGE WAYS *Jr.*

they go up *easy* and they stay put

"They go up easy," says one user of O-B Expansion Shells and Plugs, "and they stay put!" It's a good description of the success all bolting crews have wherever O-B Shells and Plugs are used to anchor roof bolts. It's also a good tip for you if you're planning to try roof bolting for the first time. Start your work with a trouble-free unit that slides up into the hole readily; that makes a firm anchorage for the bolt.

O-B Expansion Shells and Plugs are ready for use when you get them. No adjustments are needed to catch the hole wall for tightening, and they slide up over rough hole walls without digging in or binding.

Short, complete instructions in every box of O-B Expansion Shells and Plugs give your crews all they need to make quick, secure bolt installations. Why not let a trial order show you what a difference these O-B Shells and Plugs can make in your bolting cycle!

Ohio Brass

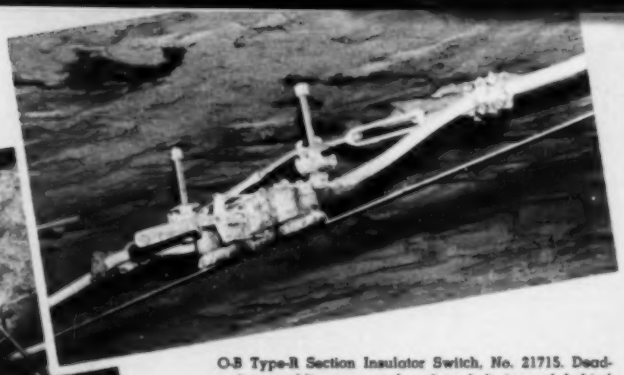
MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

Underrun of this switch shows evidence of use, but note that there is no change of levels in the collector path between the center runner and either of the trolley wires. This emphasizes the lack of arcing and wire burning when collectors move from wire to runner and back to wire again.

One dead-end assembly used here anchors one feeder cable to the other.



O-B Type-R Section Insulator Switch, No. 21715. Dead-end assemblies are anchored to bolt in roof behind switch.

Hard Work

HASN'T HURT THESE O-B TROLLEY SWITCHES!

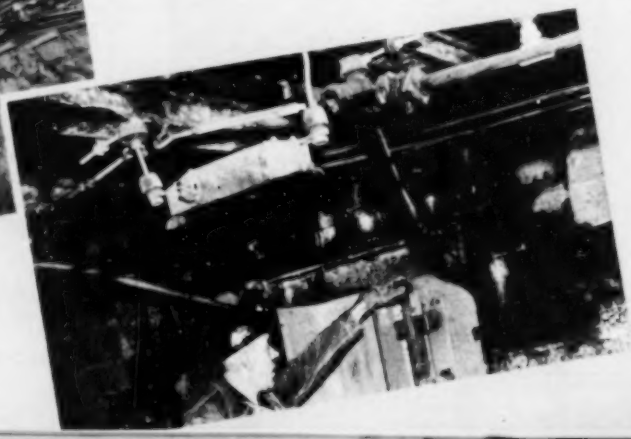
Resistance to wear is demonstrated by the center runners and trolley wire in the section insulators and section insulator switches shown here. Smooth underrun on each prevents bouncing of passing current collectors. Thus there is no arcing or wire-burning to eat away trolley wire and the center runners of these switches when collectors pass. Different dead-end anchorages at these switches are of interest, also. See photo captions.

Unpitted, unburned wires and runners show that these O-B Section Insulators and Switches guide their haulage traffic without destructive arcing. All are located in main haulage ways. There they get the most, the hardest, and the fastest traffic in their respective systems. Although some have been in place for years, they give little sign of wear.

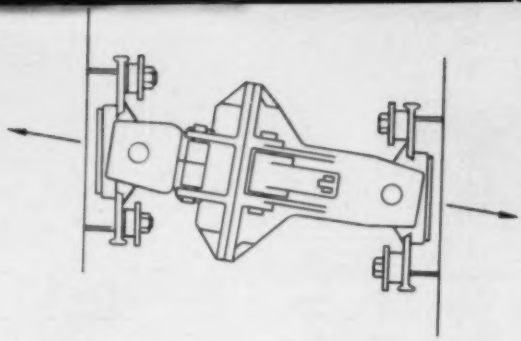
You can expect the same long, trouble-free service from all O-B Smooth Underrun trolley wire fittings. You'll get it, too! Smooth Underrun takes away the causes for bumping, arcing and burning when collectors pass.

When you put O-B fittings in your trolley overhead, haulage starts to take less and less wear out of it. Why not start your new overhead work with O-B's smooth underrun fittings!

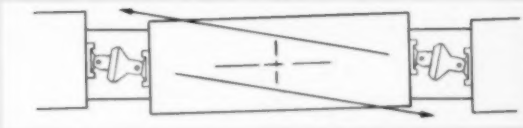
Two O-B Type-T Section Insulators flank a control switch for "Power on-Power off" track switching.



Type-T Section Insulator teamed with O-B Quick Break Switch for sectionalizing overhead circuit. Cables leading to Quick Break Switch are dead-ended on roof support beam.



Two line drawings indicate the position of the joined O-B coupler heads with respect to the cars when cars are in skewed position. Note that direction of force lines is through the center of the coupler pivot points, and that clearance exists between the coupler shank and the steel plate in the rubber buffing pad. This condition prevails until the pushing force exceeds 3000 pounds.



O-B COUPLERS KEEP CARS STRAIGHT ON THE TRACK

Track Stabilization Feature Prevents Cars From Taking Zig-Zag Position On Track . . . Drawings of O-B Coupler Explain This Important Mine Haulage Feature.

Ohio Brass

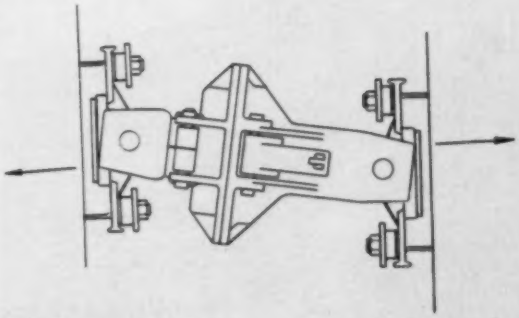
MANSFIELD OHIO, U. S. A.

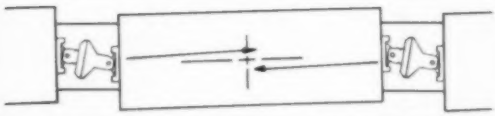
IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Unlike the action of ordinary automatic mine car couplers, O-B Automatic Mine Car Couplers actually direct the force of haulage bumps to straighten cars from a skewed position on the track. This is an important feature. Ordinary couplers, on the other hand, cause cars to zig-zag when bumped; severe bumps cause derailments and loss of time. Let the drawings here help explain the self-straightening ability of trips equipped with O-B Automatic Mine Car Couplers.

Additional information regarding O-B Couplers is available from your O-B representative or from Ohio Brass Company, Mansfield, Ohio.

After the pushing force exceeds 3000 pounds, the rubber buffing pad compresses far enough to allow the corner of the coupler shank to bear on a steel plate in the buffing pad. As soon as this happens, the pushing force acts in a new direction along the line between the points of contact of the two coupler shanks. This new direction for the force actually moves the car back into center-to-center alignment with its adjacent cars.





HAULAGE WAYS Jr.

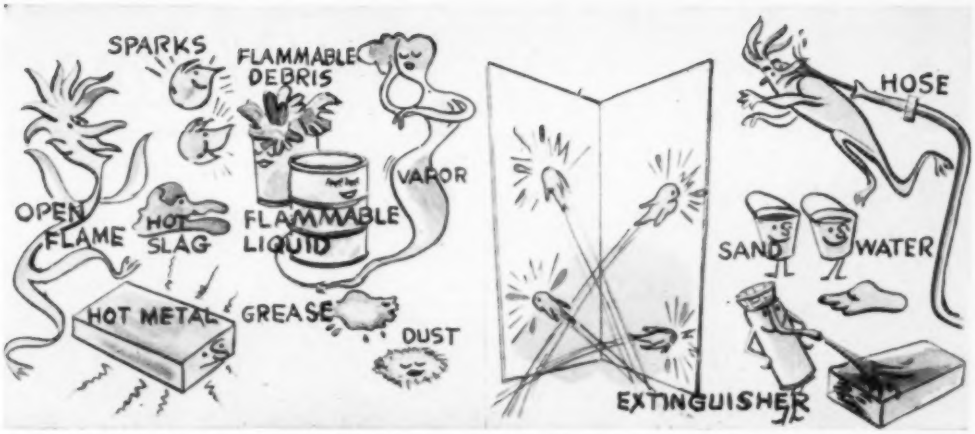
20,000 POUNDS PRESSURE

Keeps this Bond Joint tight

Drill and hammer do the work when your men bond rail with O-B Wedge-Type Rail Bonds. Simple tools like these require no special skill of the worker, yet the installed bonds make excellent electrical and mechanical joints with the rail. Tremendous pressure--about 20,000 pounds--forces the copper terminals into intimate contact with the rail web. A wedge exerts this force, holding the terminal in place permanently. But despite this high holding strength, the wedge is easily released to reclaim the bonds for a second or third use. Or more!

Good bonding without skilled welding--swift bonding--quickly reclaimed bonds--repeated use--these features make your bonding dollars do more than double duty when O-B Wedge-Type rail bonds are on the job. Try some on your next bond order!

4305-M



TROUBLEMAKERS, always present when you weld. **UNDESIRABLES** like these should not be near. **USE THESE** to prevent ignition of flammable materials and serious fires when working in a tipple.

When You Weld . . . Prevent Tipple Fires

EVERY TIME you cut or weld in your tipple a family of troublemakers is by your side waiting to have a hot time. Even though your blowpipes, regulators and hose are in good repair, they're still seeking activity. Like a contagious disease, they can cause you plenty of woe once you give them a chance.

You can prevent them from celebrating by being careful. Study how they operate, discourage them and they will disappear. Here's how to avoid the heat treatment:

1. Never weld or cut where they could mingle with this family of undesirables—flammable gas, vapors, liquids, dust or other material that burns easily. Even cutting or welding near rooms where the undesirables inhabit is not safe because sparks have a funny way of passing through openings and cracks. Flammable gas and vapors have habits of straying from home and getting into trouble.

2. Move the work where the troublemakers can't possibly cause a fire.

3. If you can't move the work, keep the undesirable family a safe distance away from it, say 30 ft. Wet wooden floors after sweeping clean. Then set pans of water or sand where they will catch dripping slag or pieces of hot metal. Protect wooden members with sheet metal.

4. If you can't move the work or the flammable material, use fireproof guards to confine the sparks to the work area. If flammable vapors are present, don't do the job. Be sure that guards are large enough and tight enough so sparks can't get underneath or through openings. Always weight curtains against the floor. Have somebody stand by to watch the sparks and give warning if they begin to fly beyond protective guards.

5. Be prepared for a fire. Have fire extinguishers, sand or water for instant use. If there is a chance that a smouldering fire may have started, keep a man at the scene of work for at least a half hour after the job is completed. This is especially important where heavy cutting is done in wooden structures.

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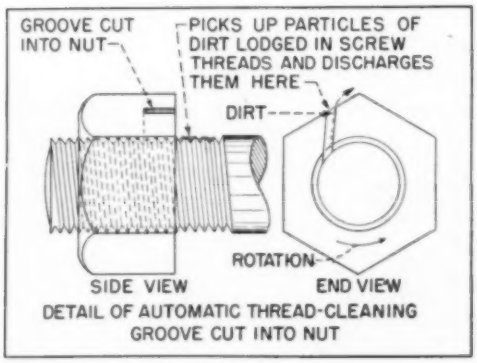
Photos and text adapted from Linde *TIPS*, published by Linde Air Products Co., New York 17.



DETAIL OF AUTOMATIC THREAD-CLEANING GROOVE CUT INTO NUT

Simple Groove in Nut Cleans Threads Automatically

SOMETIMES THE MOST SIMPLE ideas are the most ingenious. Here is one worked out by the mechanical staff of the Golden Cycle operations in Colorado, as reported in *Engineering & Mining Journal* recently. As in most underground operations, it is almost impossible to keep dirt and mud out of the threads of bolts of various types of underground equipment such as jackscrews for drill columns, side rods, hose couplings, pipe couplings, etc. If this dirt remains in the threads, it is ground into the space between the nut and the threaded surface. If, however, you cut one or more simple grooves into the nut or coupling, the grooves will act like a planer and remove the dirt particles.

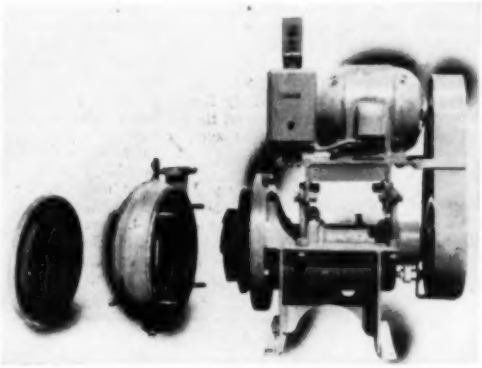
Equipment News

New-Type Rock-Drilling Head Handles Difficult Strata Effectively (1)

A new-design drill head known as No. 360 Coalmaster "ROCKet HEAD" (6¼- to 6½-in diameter) utilizes nine Coalmaster "Expenda Bits" in an entirely new and different arrangement (top photo), which is two more bits that any head of its size and type has ever before carried, the maker states. Among the features cited for the head, which can be used with various types of plain and tipped bits, are: 75% greater strength and reduced bit "wash" or side friction, which increases drilling speed and cuts driving power needed and possibilities of tip fracture or failure; reduction of core to ½ in; elimination of clogging, plus free flow of cuttings; changeability of bit positions; and cost 30 to 35% lower. In tests at strip mine in western Kentucky reported by the maker, head and bit condition was remarkably good after drilling 24 ft of extremely hard sandstone laced with pyritic bands. As shown in lower photo, six bits had a remaining life of 90% or better; two, 80% or better; and only one was extensively worn; The drill head showed only normal wear and was undamaged by friction heat, it was said. The head will be available in 3½-, 4½-, 6½-, 9- and 12-in sizes. Circle No. 1 on postage-free card for full details from Central Mine Equipment Co., St. Louis 15.

Solids- and Acid-Handling Pumps (2)

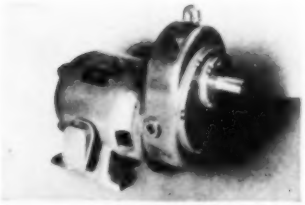
New "Vacseal" solids- and acid-handling pumps manufactured in rubber-lined and all-metal types in 2-, 3-, 4-, 6- and 8-in sizes with capacity ranges up to 3,000 gpm are said by the maker to be especially applicable for handling coal solids, washery slurries, tailings, rock refuse and slimes. The pumps operate on a patented "vacuum-seal" principle which prevents fluids or the entrained solids from being forced into the gland and require no sealing water to protect the gland and packing. The rubber-lined pumps have the lining vulcanized to the cast-iron parts with a thermosetting cement and are suitable for heads up to 100 ft, it is reported. All-metal pumps, constructed of Ferloy iron, are for handling larger particles and higher heads up to 150 ft. Bulletin PB-52, giving full details and tables on operation, design and capacities, is available from the Galigher Co., Salt Lake City.



Conveyor Weigher Adds, Subtracts and Records Tonnages to Several Points; Controls Blending (3)

Development of new conveyor-belt weighing system capable of electronically adding, subtracting and recording the tons per hour of material delivered to one or more points has been announced by the Industrial Div., Minneapolis-Honeywell Regulator Co., Philadelphia. The new belt system, developed jointly with the Trans-Weigh Co., Wayne, Pa., continuously weighs a wide range of material being delivered and provides running measurements as well as the total tonnage delivered over a period of time. The measurements can be transmitted over considerable distance and also are automatically recorded on charts at the same time. If one large belt supplies several other belts at different places along its length, the system can add and subtract to measure the quantity supplied to any or all belts, the company reports. The new system can also be installed to control the blending of several different materials on the belt, it is said. Circle 3 on the postage-free card for detailed information.

USE THE POSTCARD facing p 120 for bulletins or other data on any of the 64 items in this section.



NEW-TYPE GEARMOTOR (4)

New Westinghouse Lifeline Type B single-reduction gearmotor is said to meet the mounting limitation requirements peculiar to side entry agitators and mixers and to be suitable for light duty

Kennametal Bits

Cut 10 times more places per bit life

at Vinton Coal and Coke Co.

POWER SAVED
Use of Kennametal Cutter Bits has reduced power consumption by as much as 30% to 50% in typical Penna. and W.Va. mines. The comparisons were made using either tong-testers or watt-hour meters.

BITS STAY SHARP LONGER
The Kennametal Bit illustrated is typical of a set that cut 100 places (Winifred Seam, W.Va.) before being sharpened. Bits were still capable of cutting several hundred more places.

The severe cutting conditions at Vinton Coal and Coke Co. had often made bit changing necessary after each place cut. Bits had to be discarded after cutting a maximum of only 10 places.

The company decided to change to Kennametal to increase their tonnage per shift. They have found that Kennametal U-1 Bits give them greater production, as expected, by cutting 100 places to the other bits' 10. Important *additional* savings in time, power output, and bit sharpening costs were also effected. *Overall savings,* mine executives estimate, *amount to 5¢ per ton.*

Kennametal Bits give outstanding service because of their practical, proven design, and because their tough, Kennametal tips have shock and wear-resistant qualities equalled by no other tungsten-carbide in the coal industry. Your Kennametal representative —a veteran mining man—will gladly go into your mine to demonstrate and prove how these Kennametal advantages can reduce *your* cutting or drilling costs. Get in touch with him today!

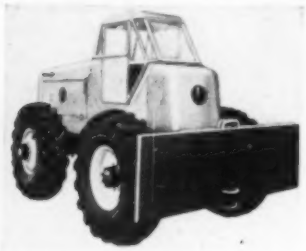
Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL®

Quality Carbide Of The Coal Industry

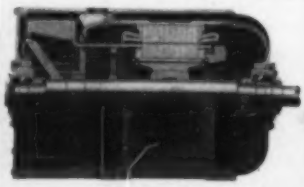
World's Largest Manufacturer of Tungsten-Carbide Mining Tools

coupled service applications such as fans and pumps. It is available in ratings from 1 to 30 hp, 780 to 420 rpm, AGMA Classes I and II. By using reduction gears, gearmotors can deliver power at speeds comparable to slow-speed motors while utilizing smaller and more efficient high-speed motors, the company points out. Further information from Westinghouse Electric Corp., Pittsburgh 30.



4-WHEEL-DRIVE UNIT (5)

New Hough Model TM "Payloader," a 4-wheel-drive rubber-tired tractor, is available with a 106-hp gasoline engine or a 90-hp diesel engine, weighs 25,000 lb and develops up to 16,000 lb and 14,000 lb drawbar pull, respectively. Among the features cited by the maker are: full reversing transmission, with four gear ratios in both forward and reverse; speeds up to 27 mph; a torque-converter drive in addition to a friction clutch; and rear-wheel steer with hydraulic power booster. The Model TM is designed for heavy-duty drawbar and pushing work, and as a flexible, efficient railroad-car switcher and spotter can pull or push 8 to 10 loaded cars. Bulletin from the Frank G. Hough Co., Libertyville, Ill.

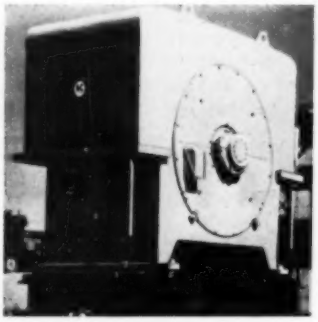


HIGH-SLIP MOTOR (6)

New G-E Type KRX totally enclosed fan-cooled, high-slip induction motor, designed for use in acceleration of high-inertia loads such as punch presses, centrifuges, hoists, etc., is said to be up to 30% smaller and 40% lighter than conventional units. The space and weight reduction, according to G-E, results from the motor's new extended-bar design which provides efficient dissipation of the increased heat normally generated by high-slip motors. Maintenance of a normal air gap between rotor and stator also reduces operating costs, it is said. Type KRX is available in 30 to 150 hp, at 900 and 1,200 rpm, 5 to 8% and 8 to 13% slip, with ratings of 220, 440 and 550 v. Details from General Electric Co., Schenectady 5, N. Y.

BATTERIES IN PLASTIC (7)

Greater economies from lower initial cost, increased efficiency and long trouble-free life are among the advantages cited by the maker for the new Type CME series of Exide-Manchex batteries in transparent plastic containers. Available in both 2- and 3-cell units built to meet service demands of stationary small power applications, the CME line features reduced weight per ampere-hour output, decreased over-all size, greater watt output per unit of space, highly sustained useful voltage, greater damage resistance, and use without wood trays. The Exide manchester-type Plante positive plate is used. Colored pilot balls reveal at a glance the state of charge in the batteries, and colored lines on the containers mark the recommended electrolyte levels. Bulletin from the Electric Storage Battery Co., Box 8109, Philadelphia 1.



WEATHER-PROTECTED MOTORS (8)

A new outdoor weather-protected motor said to carry protection much further than the splashproof design has been announced by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., for semioutdoor and outdoor installation. The new motor has varied features designed to keep wind-driven heavy moisture out of its windings and its intake velocity has been reduced to less than 600 fpm so that heavy rain particles cannot be drawn into the motor. To prevent dust and dirt from entering, the air intakes are located at a considerable height above ground level and are provided with screens installed to stop larger particles. Air filters also can be used. The A-C weather-protected motor is available in the full range of ratings required for major auxiliary drives. Details from the maker.

SHALLOW-PIT SCALES (9)

New Cox & Stevens electronic-type scales for weighing motor trucks from 10 to 50 tons and railroad cars up to 400 tons are said to be priced lower than most lever-system scales and offer additional savings in installation from the shallowness of the pit required. Truck platforms are supported by four or six hermetically sealed electronic weighing cells only 6 in high, which transmit the weight impulse to the indicator giving both printed and visual weights. No other equipment is required in the scale pit and the scale can be easily relocated if necessary. For check weighing and modernization, the electronic equipment may be installed in most existing track lever-type scales, it is said. Bulletin on the Model MP-1 from Cox & Stevens Aircraft Corp., Mineola, N. Y.

DRY-TYPE TRANSFORMERS (10)

Type E completely enclosed, nonventilated dry-type distribution transformer for service on secondary circuits rated 600 v and below has been developed by the Westinghouse Electric Corp., Pittsburgh 30, and supersedes the Type AJR line of dry-type transformers. The enclosed distribution transformer utilizes Hipersil cores and Class H silicone insulation and operates at 120-C rise. In addition to the 3-, 5-, and 10-kva AJR sizes superseded, the Type E unit also will be built in 15-, 25-, 37½-, and 50-kva ratings. More information available from Westinghouse.

PULL-TYPE SWEEPER (11)

Meili-Blumberg Corp., New Holstein, Wis., offers details on its new Model 53M engine-driven pull-type sweeper powered by a Wisconsin VE4 engine with built-in heavy duty clutch and featuring a 30-in-diameter 96-in brush that is quickly set at a 30-deg angle to sweep

JOY SAL-37T
TELESCOPIC FEED—LONG STEEL CHANGES—LIGHTWEIGHT LOW AIR CONSUMPTION

JOY SAE-9IT
TELESCOPIC FEED—LONG STEEL CHANGES—SHORT OVERALL LENGTH—HEAVY DUTY

THESE ROOF-BOLTING STOPERS GET THE JOB DONE FASTER and CHEAPER

You can cut your roof-bolting costs away down with Joy Stopers . . . with constant-pressure telescopic feed and centralized control.

In the first place, the long steel changes that Joy Drills afford mean *fewer* steel changes for your roof-bolters and more time spent in actually drilling . . . *more hole footage per shift.* What's more, fewer steel sizes need be carried in stock and hauled to the face.

In the second place, Joy Stopers have several exclusive features: such as *cadmium-plating* inside and out for rust-protection, closer tolerances and easier run-ins . . . and the famous *Dual Valve* that "makes air do more work". These features make for greater efficiency, longer service life and less maintenance.

Joy builds a complete line of roof-bolting equipment—air-operated or hydraulic. ● *Call on us for details . . Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

SPECIFICATIONS

	SAL-37T			SAE-9IT			
Steel Changes	30"	36"	42"	30"	36"	42"	48"
Weight	63#	65#	67#	98#	103#	106#	109#
Collapsed Length	25"	28"	31"	23¼"	29⅝"	32⅝"	35⅝"
Extended Length	61"	70"	79"	57½"	73⅛"	82⅛"	91⅛"

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

WBD CL-4301

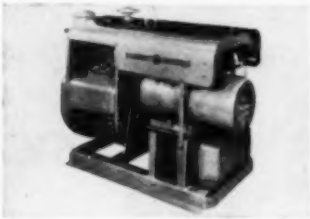
a 78-in path to either the right or the left. The frame is equipped with a balance spring permitting the brush to float over uneven surfaces and the brush height is quickly and easily adjusted by a hydraulic pump and ram, with a safety brush lock for high-speed trailing. A sprinkler attachment is available.

HANDLE FUSES SAFELY (12)

The Electric Machinery Mfg. Co., Minneapolis 13, has developed a new gang-operated disconnect method for de-energizing fuses on high-voltage motor control, making them safe and convenient for handling. The new high-voltage "Sa-Fuse" compartment uses a movable panel which is automatically pulled to the front as the compartment door is opened, disconnecting the fuse panel from the line and putting the fuses within easy reach. Bulletin 3300-PRD-211 provides full data on this high-voltage, high-interrupting-capacity fuse protection for synchronous and induction motors.

60-TON TRAILER (13)

New 60-ton industrial "Phil-Trailer" designed for heavy-duty service is equipped with eight solid rubber-tired wheels and a body framework of I-beams and channels, with a deck surface of smooth steel. Available in two styles, Model TF-1200, with fifth wheel on the front axle only, and Model TD-1200, with fifth wheel on both front and back axles for extra maneuverability, the trailer may be pulled either singly or in train by an industrial tractor. Basic size is 7½ ft wide by 12 ft long, but can be custom-built to larger sizes. Details from Phillips Mine & Mill Supply Co., Pittsburgh 3.



ENGINE-DRIVEN WELDER (14)

New G-E Type WD-42AGW 200-amp engine-driven DC arc welder with a 60% duty cycle has a current range of 40 to 250 amp and can be used with a variety of electrode sizes for repair, maintenance, and construction work. Consisting basically of a G-E Type WD42 generator and a Wisconsin air-cooled engine, it is designed to fit crosswise in a standard pick-up truck, but optional equipment includes a trailer equipped with fittings for pressure lubrication. A vacuum-type device saves gasoline by idling the engine when welding is not being done. Full data in Bulletin GEC-917 from General Electric Co., Schenectady 5, N. Y.

LOW-COST TRUCK HOIST (15)

The Jumbo Twin, a 7-ton farm-type-truck body hoist for use with 1½- to 2-ton trucks, announced by National Lift Co., a subsidiary of Gar Wood Industries, Inc., Wayne, Mich., features a simple direct-lift design for trouble-free operation and a minimum of moving parts for low maintenance cost. Initial cost is 20% less than comparative units, mounting is simplified and it is up to 50% lighter, thus permitting a greater payload, the maker reports. No power take-off is required. Bulletin offered by the company.

STAND-BY ELECTRIC PLANT (16)

A new electric-generating plant, engineered primarily for emergency stand-by service has a 10-kw capacity and is available with electric starting or controls for automatic starting. Its 4-cylinder air-cooled gasoline engine minimizes maintenance and use of the close-coupled engine and generator makes it an extremely compact unit, for saving on installation space, the maker says. Bulletin DHE-1 with details of the low initial and minimum operating expense offered by Universal Motor Co., Oshkosh, Wis.

Equipment Shorts You'll Want to Check

(17) FIRE-HOSE CARTS lighter in weight because of all-welded construction reportedly can be brought into action faster and permit even inexperienced personnel to extinguish or bring fires under control before heavier apparatus arrives. Storage for hose lines, fire axe, crowbar, nozzle and tools is provided. More information from Wirt & Knox Mfg. Co., Philadelphia 32.

(18) NEW HYDRAULIC END-LOADER for all makes of motor trucks 1½ ton and over, announced by the Galion All-steel Body Co., Galion, Ohio, is known as the Galion Hydraulic "LOAD-evator," and is available in four models with loading space of 28 x 84 to 34 x 90 in. LOAD-evators have a load capacity of 2,000 lb and are said to offer a 50% reduction in delivery time on heavy or

bulky articles and eliminate need for costly loading docks. Bulletin 652-L available.

(19) BOLT FASTENERS — Precision-forged, threaded 12-point aircraft-type fasteners in ferrous, non-ferrous and precious metals are available in all stand-

QUAKER *Production-eered** BELTING

QUAKER CONVEYOR BELTING

HAULS MILLIONS OF TONS...NO WEAR...CUTS COSTS

Hauling underground . . . cutting overhead—that's the record of QUAKER Conveyor Belting in the Quality Excelsior Mine at Greenwood, Arkansas. More than 1500 tons of coal hauled every day over this 36 inch by 3700 foot belt have left no signs of wear on its tough, wear resistant construction. Traveling at the rate of 350 feet per minute, this QUAKER Belt speeded up production.

North, east, south, and west QUAKER Conveyor Belts are being specified by leading mines for more production . . . QUAKER "Production-eered" Belts have proved their value for cutting costs and keeping output up.

Above or below the ground QUAKER has the proper "Production-eered" rubber product to reduce maintenance and cut overhead: flat transmission and V-belts; air, water and steam hose; sheet packing; mine cable guards and many others.

***Production-eered** Every Quaker Industrial Rubber Product is "production-eered"—engineered to provide maximum life, efficiency and production on each type of installation. For timely production tips get your copy of the new free booklet "Production-eered" . . . for Greater Output.

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CONTROLLED TIMER

at a price you can afford

PRE-SET, TAMPER-PROOF TIMING

Practically non-breakable, Durakool Pre-set Timer Relays have more than proved themselves on the roughest and toughest jobs that could be found. Year by year, their use increases in sensational fashion. Controlled time available from .15 to 20.0 seconds in either normally open or normally closed actions. 3 to 4 week delivery. No waiting. Your production schedule is met.

- ★ No false contacts
- ★ No chatter
- ★ Quiet in operation
- ★ Eliminates double contacting or breaking of circuit

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DURAKOOL, INC., Elkhart, Ind.

Durakool

ALL-STEEL MERCURY *Timers*

ard diameters and lengths of a wide variety of bolts and screws for industrial, automotive and other use. The non-slip type 12-point fasteners are specifically designed to permit higher torque loads and will accommodate the standard 12-point socket- or box-type wrench, with functional "lock-in" permitting one-hand wrench operation in awkward spots. Full details from the Twelve-Point Fastener Co., 4517 Lorain Ave., Cleveland.

(20, 21) AUTOMATIC LUBRICATORS—New line of Style DOSF large-capacity gravity-feed oilers, in capacities from 9 oz to 1 gal, has been announced by Oil-Rite Corp., Manitowoc, Wis. The new units supplement the recently improved line of small-capacity oilers (⅜ to 8 oz), with all models offering adjustable drop feeding from a visible reservoir. Circle 20 for Bulletin 61-11 on the larger units; Circle 21 for Bulletin 61-1 on the small-capacity oilers.

(22) BUSHING—New Aeroquip "Bushing with the Broach," designed to eliminate the necessity of drilling and reaming holes to close tolerances, has a series of minute cutting edges on the outside which literally cut their way into position with uniformly accurate results. Once installed, the bushing is firmly locked in position and will work satisfactorily with a maximum tolerance of .002 in, the maker says. Full details from Aeroquip Corp., Jackson, Mich.

(23) CIRCUIT TESTER—New pocket-size Test-Glo, designed to combine maximum safety with ease of use can be used for checking electric circuits, spark plugs, motors, fuses and a variety of electrical equipment. Capacity includes voltages from 80 to 600, AC or DC. Bulletin Section L-2a giving full details from Ideal Industries, Inc., Sycamore, Ill.

(24) TRUCK TRANSMISSIONS—Ford Div. of Ford Motor Co., Dearborn, Mich., has announced that its new 1953 line of F-100 series trucks, including pick-up and panel delivery, will be equipped with fully automatic transmissions as optional equipment. Reportedly first to announce utilization of a fully automatic transmission in this type of truck, the company cites as advantages the ease of driving and reduction of operator fatigue, plus economy averaging approximately the same as conventional drive.

(25) WIDER RADIO OPERATION is possible with a new remotely controlled base station introduced to complement Motorola's recently announced line of 450 to 470-mc 2-way radio equipment. The new unit is used to increase the operating area of a base-to-mobile communications system or extend the signal path between the end points of a point-to-point relay system. Full data from Motorola, Inc., Chicago 51.

(26) WIRE CONNECTOR—New set-screw-type "Hi" wire connector consists of two parts, a solid brass sleeve with set screw and a Bakelite shell. To splice two or more wires together, the stripped wires are inserted into the sleeve, the set screw tightened with an ordinary screwdriver and the Bakelite shell screwed on over the entire joint. Underwriters' Laboratories approval includes both solid and stranded wire and combinations of both in various sizes and the connector may be easily removed and re-used. Bulletin SSWC-752 giving details and prices from Holub Industries, Inc., Sycamore, Ill.

(27) A "YOU-TRY-IT" KIT of permanent magnets is available to enable engineers and operating officials to experiment and devise their own new uses for permanent magnets within their operations. Two kits are available: Shop Package No. 1 contains 48 Carboloy permanent magnets in eight styles, with up to 2-lb pull for each; Package No. 2 contains 18 larger magnets in four different styles, with pull of 3 to 12 lb. Descriptive literature from Carboloy Dept. of General Electric Co., Detroit 32.

(28) GAS DETECTOR—The Model 2 portable MSA Explosimeter designed for detecting hazardous gas or vapor-air atmospheres, and the special filter cartridge used with it, have been listed by the Underwriters' Laboratories, Inc. Provided with this light compact instrument, powered by flashlight batteries, is a sampling line of synthetic rubber, recommended for use in remote sampling of atmospheres which may be explosive. Full details from Mine Safety Appliances Co., Pittsburgh 8.

(29) ARC-WELDING GROUND CLAMPS—New low-priced Model GC-200 "Cub" ground clamp with a rated capacity of 200 amp follows the basic Tweco design and permits shifting ground connection easily and quickly to reduce "arc blow," and shortening the welding circuit for current economies. Details from Tweco Products Co., Wichita 1, Kan.

(30) SAFETY SOLVENTS—Orthosene, Per-trolene and Frigisol "safe" safety solvents for electrical, mechanical and metal parts degreasing are designed to replace carbon tetrachloride and offer varying drying rates and flash points for safe, no-toxic application in various types of work. Data sheets giving full details from John B. Moore Corp., Nutley, N. J.

EQUIPMENT BULLETINS AVAILABLE

(31) TO HELP WIRE-ROPE USERS become more expert wire-rope buyers, A. Leschen & Sons Rope Co., St. Louis 12, Mo., has issued a 64-p pocket-size "Wire Rope Handbook." Included are descriptions, diagrams and illustrations of wire-rope types and constructions, helpful information about lubricants, working loads, safety factors and specifications, plus calculations for the proper

USE THIS CARD

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Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (December, 1952)

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3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63
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In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

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Company .....

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NOT GOOD if mailed after February 1, 1953

selection of wire-rope attachments. Circle 31 on the postage-free card for Handbook R-51.

(32) OPEN-PIT ELECTRIFICATION—A comprehensive 39-p Book B-5447 on "electric power distribution and protection for open-pit mines and quarries," which is available from the Westinghouse Electric Corp., Pittsburgh 30, discusses the complete electrical system, from initial power distribution to maintenance of apparatus. Ratings of transformers, shovel performance, power-factor correction and distribution-system layouts for different types of mines are followed by a discussion of various systems used for ground protection, the over-all problem of grounding and recommendations for substantial protective apparatus. The Westinghouse line of equipment is described and illustrated.

(33) CENTRIFUGAL - PUMP SELECTOR—Allis-Chalmers' broad line of centrifugal pumps is highlighted in a new "Handy Guide to Selection of Centrifugal Pumps" which, in addition to covering general-purpose, double-suction, multistage, special-purpose, marine and mixed- and axial-flow pumps, contains a head-capacity table for single-stage double-suction Allis-Chalmers pumps. Special-purpose pumps mentioned include solids-handling, sewage, rubber-lined, process, fractional horsepower, coolant and circulating units. Bulletin 52C6059J available from Allis-Chalmers Mfg. Co., Milwaukee 1.

(34, 35, 36) FOR OFFICE MANAGERS, PURCHASING AGENTS OR CHIEF CLERKS, Remington Rand, Inc., New York 10, offers separate booklets that show new methods for more economical invoicing, cheaper payroll preparation, and more efficient purchasing operations. Circle 34 on the postage-free card for Booklet AB569 on the new Stub-Check plan to cut payroll costs and speed paychecks by mechanized accounting. For Booklet C253 describing how the Remington-Rand printing calculator and Electri-conomy typewriter are paired for faster, more economical invoicing, as well as other typing and figuring work, circle 35. Booklet X-1202, entitled "Purchasing Procedures to Save Time and Money," details effective methods for processing requisitions, procuring bids, placing and following-up orders, with a checklist for a survey of your department (Circle 36).

(37) CARBURETOR HANDBOOK, a 46-p pocket-size booklet, entitled "Know Your Carburetor," is pointed particularly to the man who has not had extensive training in carburetor servicing, with various sections such as how carburetors work, carburetor trouble, carburetor care, how to clean, how to adjust, etc. Each section contains easy-to-understand descriptions and detailed illustrations that show the various carburetor parts and how they function, the common troubles and how to correct them. Available from Pennsylvania Refining Co., Cleveland 4.

(38) "WHYS AND WHEREFORES OF LUBRICATION" are comprehensively discussed in a 26-p booklet published by the service department of the Euclid Road Machinery Co., Cleveland 17. The booklet not only details procedures for Euclid equipment, but discusses the fundamentals of lubrication, lubricant characteristics, properties and tests, reasons for oil and lubricant changes, proper lubrication intervals and recommended procedures.

(39) CENTRALIZED LUBRICATION—Bulletin 529 offered by Trabon Engineering Corp., Cleveland 3, covers the application of patented Trabon automatic lubrication systems available for a wide range of large and small machinery. The folder includes an engineering description of technical methods of operation, for both Trabon's Reversible and Manifold types of lubrication systems.

(40) HEAVY-DUTY SCREENS—Allis-Chalmers' complete line of vibrating screens for the mining industry is described in Bulletin 07B7868, including R-O-M screens for primary scalping, scalping screens for sticky ores, secondary scalping screens, conventional screens for wet or dry sizing and screens for heavy-media separation. Also shown is a typical flow sheet showing how horizontally operated "Low-Head" screens are used in the sink-and-float process. Available from Allis-Chalmers Mfg. Co., Milwaukee 1.

(41, 42) WIRE-ROPE RECOMMENDATIONS FOR MINING, listing specific applications for both underground and strip mining, are presented in separate booklets offered by two divisions of the American Chain & Cable Co., Inc., Wilkes-Barre, Pa. Circle 41 on the postage-free card for Bulletin DH-128-A covering specifications and application of Tru-Lay preformed wire rope from the American Cable Div. For similar data on Lay-Set preformed wire ropes from the Hazard Wire Rope Div., circle 42 for Booklet DH-129-A.

(43) ELECTRICAL WIRING—New 24-p booklet, "Safety Mineral Insulated Wiring System," available from the General Cable Corp., New York 17, contains a complete history and a detailed explanation of the characteristics and applications of this new wiring, designed as a simplified, dependable and permanent wiring system for nearly all types of electrical circuits in the 0-600-v range.

(44) WOOD PRESERVATIVE—Booklet T25-601 published by the Tar Products Div., Koppers Co., Pittsburgh 19, is designed to give the complete answer to the question, "Why creosote protects wood today every bit as well as 50 yr ago." Discussed in detail are creosote composition, application, cost factors and users' experience.

(45) ENGINEERED M-G SETS for all industries are discussed in Bulletin F-2502 issued by the Reliance Electric & Engineering Co., Cleveland 10. Briefly described is the complete line and applications of "custom-tailored" m-g sets—shunt or compound wound, ¾ to 1,000

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kw—designed to provide power for constant-voltage or adjustable-voltage systems and engineered to include synchronous or induction motors.

(46) CENTRIFUGAL PUMPS—Bulletin 952, "Nagle Pumps Selector," published by Nagle Pumps, Inc., Chicago Heights, Ill., contains cross-section drawings, descriptions and suggested applications for nine different centrifugal pumps for abusive industrial applications.

(47, 48) WIRE-ROPE ASSEMBLIES—Circle 47 on the return card for Bulletin DH-200 from the Wire Rope Sling Dept., American Chain & Cable Co., Inc., Wilkes-Barre, Pa., showing the application and specifications of ACCO-Registered Dualoc boom cable assemblies. The company also offers Bulletin DH-311 describing Dualoc wire-rope endings with thimble or loop (circle 48 on card).

(49) SELECTION OF PACKINGS for maintenance use is simplified with Catalog PC-102 covering all Palmetto packings offered by Greene, Tweed & Co., N. Wales, Pa. Application chart, ordering tables and other details in the 20-p booklet cover Palmetto self-lubricating, molded and sheet packings, plus information on Palmetto Teflon, latest addition to the Palmetto line.

(50) INDUSTRIAL FANS—Eleven sizes of new industrial fans and their standard wheels are fully described in a new 12-p Booklet SA-6873 available from the Westinghouse Electric Corp.'s Sturtevant Div., Hyde Park, Boston 36. Covered are fans ranging from 670 to 44,000 cfm at pressures up to 16-in mercury, with a table of condensed specifications on performance and dimensions, and applications of the three available wheel types.

(51) SELENIUM RECTIFIERS offered by the American Rectifier Corp., New York 13, are discussed in Bulletin 271 available from the company. The units are made in ratings of 3 to 1,000 kw, AC up to 12,000 and DC up to 10,000 v.

(52) PROTECTIVE COATINGS—New revised catalog from the Magic Chemical Co., Brockton, Mass., contains complete details on Magic-Vulc anti-abrasion and anti-corrosion plastic-rubber coatings. Among the applications described are the coating and repair of worn conveyor belts without removing belt from pulley or without the use of heat or special machinery and as a coating to line, resurface and protect all types of industrial equipment against corrosion and abrasion.

***(56) FOR SHOWINGS* before business, trade and educational groups without charge, Cummins Engine Co., Inc., Columbus, Ind., has released a new 45-min 16-mm film, photographed in color, entitled "Diesel Race Car." The movie traces the development of Cummins Diesel Special No. 28, from an idea through the 1952 Indianapolis 500-mi Memorial Day Classic. Cummins Diesel Special No. 28 won the coveted pole position for the 500-mi race with a record-breaking 4-lap qualification speed of 138.010 mph. More information from the company.**

(53) TOOL AND SPECIAL-PURPOSE STEELS for maintenance and repair available in the line of the Pyramid Steel Co., P. O. Box 1226, Cleveland 3, are illustrated and described in a 22-p handbook offered by the company. Included are non-tempering steel, pneumatic and shock steel, turned-ground and polished shafting steel, heat-treated alloy steels, brake-die steel, oil-hardening die steel and abrasive-resisting plates. Additional pages cover types for rebuilding worn crawler grousers and for filler bar applications and include welding instructions for maintenance applications, tables, etc.

(54) TACHOMETERS—Bulletin S1402 describing its full line of recording and indicating electric tachometers is available from the Bristol Co., Waterbury 20, Conn. The 20-p booklet covers units for measuring speed of rotation or travel, processing time, speed ratios, sum or difference of speeds and average of speeds, as well as the recently announced electronic Dynamaster recording tachometers, magnetos and magneto drives.

(55) TEMPERATURE RECORDERS—Bulletin 447, issued by the Foxboro Co., Foxboro, Mass., contains complete details of temperature-recorder construction, with full factual information on the principles, selection and use of temperature-measuring instruments. Characteristics of vapor-pressure, gas-pressure and liquid-expansion systems are explained and indicating- and controlling-temperature instruments also are covered.

(57) STEEL SHELVING, lockers and other storage and maintenance equipment for industrial use in its line are described, together with prices, in the new 32-p catalog available from Precision Equipment Co., Chicago 41.

(58) MEASURING INSTRUMENTS—Catalog 1520 contains factual information on ElectroniK non-control precision instruments, which employ a potentiometer, Wheatstone bridge or other measuring circuit to measure temperature, pressure, flow, pH and many other variables. Actually a handbook for use of engineers and buyers, the booklet presents detailed specifications for each particular model and includes information on various specially adapted instruments. Available from Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia 44.

(59) GAS-DRIVE ARC WELDERS—Bulletin describing the complete line of Hobart gasoline-engine-driven arc welders available from Hobart Bro. Co., Troy, Ohio, offers complete electrical and mechanical specifications for the arc welders and a combination model of arc welder and power unit.

(60, 61) TARPAULINS AND DROP CLOTHS—Circle 60 for Circular 14-GP-5-52 on Penguin tarpaulins available in two colors. For Bulletin 13-GP-5-52 on Dandux painters' drop cloths, circle 61. Sizes and construction covered fully in each. Available from C. R. Daniels, Inc., Daniels, Md.

(62) CUTTING TORCHES and cutting tips available from K-G Equipment Co., Allentown, Pa., are illustrated and described, with sizes and specifications, in Catalog Sheet M38 offered by the company.

(63) ALL-LEATHER HEAT-RESISTANT GLOVES, said to be able to "take" temperatures up to 800 F, are described in a new bulletin offered by Mine Safety Appliances Co., Pittsburgh 8. The reversible gloves, made by the Liberty Dressing Co., Gloversville, N. Y., are said to be pliable, durable, comfortable and economical for use in welding, foundry work, etc.

(64) POCKET CALENDAR for 1953 offered by Armco Drainage & Metal Products, Inc., Middletown, Ohio, also carries a sheet-steel gage table, circular-areas table, corrugated-metal-pipe weight table and section moduli for various construction products.

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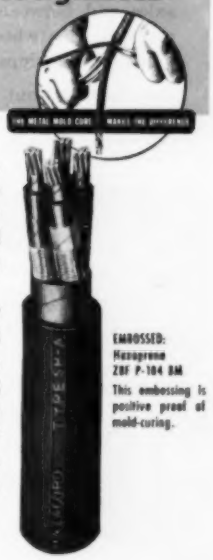

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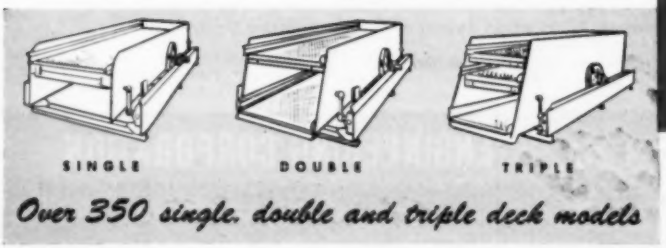

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NEWS Round-Up

Putnam Stalls Wage Decision; Lewis Sees "Unrest, Confusion"

WHILE MINERS waited for an early ruling by Economic Stabilizer Roger Putnam on the legality of the 40¢ the Wage Stabilization Board clipped off their $1.90 boost in October, Mr. Putnam held an open hearing and a private meeting with principals in the case.

At the open hearing Nov. 17, Mr. Lewis, referring to the joint operator-UMWA petition for over-riding the WSB decision, said, "We are calling now for immediate approval." He continued: "We think there is grave unrest in the mining population. Those miners think they have a contract with Moses and other interests in the coal industry. They expect that contract to be lived up to."

Mr. Lewis warned Mr. Putnam that a ruling unfavorable to the miners would result in their waiting "until you are no longer here (I understand from the papers that you are leaving soon) and the WSB has gone back to Harvard and the cloisters of the National Association of Manufacturers and then they will ask Mr. Moses to deliver under that contract to the letter. In the meantime, there is going to be unrest and confusion and inference."

At the same hearing Harry Moses, president, Bituminous Coal Operators' Association, explained the position of his group in the wage negotiations and discussed considerations involved in the contract terms. Gist of his arguments and those of Mr. Lewis was that the miners are paid less in holidays, shift differentials and vacations than most other industrial workers and that they prefer money in straight wages rather than in fringe benefits. At the time when the WSB knocked the miners' $1.90 down to $1.50, some WSB members suggested that the 40¢ might be granted in side benefits. At the open hearing Mr. Lewis, protesting that he was "a timid man," told Mr. Putnam that he had not asked Mr. Moses for "hot noonday lunches, midmorning coffee or time off to watch parades."

Following the open hearing, Mr. Putnam declined to set a date for rendering his decision. He said he was not sure whether he should write his opinion first and then rationalize it or prepare the justification first and then write the decision.

The private meeting of Mr. Putnam, Mr. Moses and Mr. Lewis took place Nov. 19. Mr. Putnam's aides said that the meeting was called not to discuss a decision but to provide additional data on coal wages that Mr. Putnam did not have at his fingertips. Following this meeting, Mr. Putnam said he hoped to announce his decision before the weekend. Later, on Nov. 21, he postponed his decision into Thanksgiving week.

Meanwhile, in scattered mining areas, some workers walked off the job Nov. 18, shutting down operations. Reasons for the halt were not clear, nor did the stoppages last long. The belief in some quarters was that the miners were putting on a show of strength to speed Mr. Putnam's decision. Elsewhere, the stoppages were attributed to misunderstanding over the date when operators should notify local unions of payments into the welfare fund. Union officials argued that they should be notified before the 18th of each month while operators contended that notice should go out on or before that date. The notification clause was written into the new contract that was signed at the end of September.

Earlier, on Nov. 10, the way was opened for payment of an additional 10c per ton into the welfare fund when Mr. Lewis notified Mr. Moses that no increase in welfare benefits is contemplated. Under these circumstances, WSB approval of the increase is not needed.

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Industry Leader Named To Eisenhower Cabinet

George M. Humphrey, named Nov. 21 by Gen. Eisenhower to be Secretary of the Treasury, is a prominent Cleveland industrialist who has long been a leader in the iron, steel and coal industries. At the time of his appointment, he was chairman of the boards of both the M. A. Hanna Co. and Pittsburgh Consolidation Coal Co. After his graduation from the University of Michigan in 1912, Mr. Humphrey practiced law for 6 yr, joining M. A. Hanna as its general attorney in 1918. Six years later he became executive vice president and in January, 1929, was named president. He was recently advanced to board chairman. Mr. Humphrey was one of the key figures in organizing Pittsburgh Consolidation in 1945 and has served as chairman of its board for several years. In 1947, Mr. Humphrey and Benjamin E. Fairless, then president of U. S. Steel Co., broke a bargaining deadlock by negotiating a contract with John L. Lewis that quickly set the pattern for the entire industry. Although shy of personal publicity, Mr. Humphrey is widely known in business and industrial circles and has long been a supporter of Sen. Robert A. Taft.

New Anthracite Pact Matches $1.90 in Bituminous

UNION NEGOTIATORS headed by Thomas Kennedy, UMWA international vice president, won a wage increase Nov. 1 for anthracite miners that matched the $1.90-per-day pay rise won earlier by bituminous miners. Wage terms of the new anthracite pact, like those in bituminous, are subject to approval by the Wage Stabilization Board, which refused in mid-October to allow more than $1.50 to bituminous miners.

Mr. Kennedy and Edward G. Fox, chief negotiator for the operators and president, Philadelphia & Reading Coal & Iron Co., said the anthracite increase would be so distributed among hourly and tonnage workers as to average $1.90 a day. Operators were expected to ask WSB to allow the full increase and to petition OPS for higher ceiling prices to offset the wage rise.

Some observers linked the fate of the anthracite agreement to that of the bituminous contract and predicted that WSB would not act on the anthracite agreement until it had ruled on the bituminous contract. Others saw a loophole, in a production incentive for tonnage miners, that might allow WSB to grant the full increase.

News Briefs and Trends

FBI Investigates Violence In Widen, W. Va., Strike

FBI investigators arrived in Widen, W. Va., Nov. 17, to investigate violence growing out of the 2-mo-old strike at the coal operations of the Elk River Coal & Lumber Co. The FBI was asked by the company to check for violations within its jurisdiction after two bridges on the Buffalo Creek & Gauley R. R., a subsidiary, were dynamited Oct. 23. Two days later, a report of an unsuccessful attempt to dynamite a company substation was called a hoax by an Elk River official. The strike, in which the UMWA is seeking to replace the Independent Employees League of Widen Miners as bargaining agent for the property, has been marked by riots, shootings and mass picketing. In replying to a suggestion by State Labor Commissioner Charles J. F. Sattler that his department hold a collective bargaining election with both the UMWA and the independent union on the ballot, J. G. Bradley, Elk River president, pointed out that his company had a contract with the independent group that runs until next year. In a letter released publicly, Gov. Patterson Nov. 14 called on state police to maintain law and order in the area and said he could not understand its "apparent failure" to do so. There had been various reports that the police were unable or unwilling to control the situation. Some members of the independent had continued to work during the disturbance and by mid-November there were reports that the situation was beginning to ease. On Nov. 14, about half of the normal 600-man force reported for work, the largest group since the start of the strike, a company official reported.

UMWA Fined in Ohio Picketing

The UMWA and nine officers, organizers and members of District 6 were fined a total of $7,500 and given suspended jail sentences of 10 to 20 days in a Zanesville, Ohio, court Nov. 15, for ignoring an injunction against mass picketing and violence. The contempt of court charges came as a result of charges of violating a May 28 injunction brought by the Bruns Coal Co. Ernest Bruns, company owner, told the court that he was forced at gunpoint to suspend operations Oct. 23 and was then assaulted by union members. He charged that the injunction was again violated Oct. 30. The jail terms were suspended on the condition that the fines be paid shortly and the injunction complied with.

Thin-Seam Equipment Judged As Capital Expenditures

In a recent decision of interest to mining companies, the U. S. Court of Appeals for the Fourth Circuit reversed the Tax Court and ruled that: "The cost of mine equipment, such as conveyors, loaders, cutting machines, a slate chute and electric mine jeeps, was a capital expenditure, and not a current business expense, where the equipment was necessitated by the thin seams of coal encountered, the change in the character of the coal being mined and the increasing difficulty of obtaining manpower." In arriving at the decision in the case of the H. E. Harman Coal Corp. v the Commissioner, the court cited the general rule in the regulations that equipment purchases "necessary to maintain normal output solely because of the recession of the working faces of the mine and which (1) do not increase the value of the mine, or (2) do not decrease the cost of production of mineral units, or (3) do not represent an amount expended in restoring property . . . shall be deducted as ordinary and necessary business expenses."

EG&FA Miners Cited for Service Periods up to 50 Yr

Some 248 mine workers at mining operations of Eastern Gas & Fuel Associates in Pennsylvania, West Virginia and Kentucky, are being honored in 1952 for service of from 20 to 50 yr, according to D. C. Stewart, manager of the company's industrial relations department. They are among 1,848 employees who have established long records of employment since 1948 when Eastern initiated the practice of awarding service pins to veteran employees. The pins are being presented at ceremonies at the individual mines.

Indiana Public Service Plans New 600,000-Kw Steam Plant

A new steam-generating power plant with a possible capacity of 600,000 kw is now in the planning stage, according to a recent report from H. A. Gallagher, president of the Public Service Co. of Indiana. Sites for the plant on the Ohio River being considered include those near Jefferson, Ind., and New Albany, and one location as yet unnamed. The company is reported to have 175 acres under option in the vicinity of New Albany. The proposed plant is expected to involve an expenditure of $45 million.

1952 Production Estimated

Total 1952 bituminous and anthracite output through the week ending Nov. 15, according to USBM figures, was 403,100,000 and 34,482,000 tons, down 14.1% and 7%, respectively. If production continues normally for the rest of the year at the current rate, total bituminous mined in 1952 may be expected to run around 465,000,000 tons, and anthracite in the neighborhood of 40,000,000 tons. According to final figures recently released by the USBM, total output for 1951 was 533,664,732 tons of bituminous and 42,669,997 tons of anthracite.

NCA Aids Retailer Groups

Development by its Marketing Committee of a new cooperative arrangement by which the National Coal Association is prepared to extend financial aid to interested retail coal associations for promotional and merchandising activities was announced Nov. 4 by Tom Pickett, NCA executive vice president. At the same time, it was reported that the first contract under the arrangement had been signed by the Chicago Coal Merchants' Association. In addition to the three channels through which it now offers retailers financial aid for market promotion, NCA has steadily increased the number and variety of its merchandising aids and personnel training services offered to all retailers, irrespective of their acceptance of financial assistance.

Coal Company Earnings

In each case, earnings reported are for the 9 mo of 1952, compared to the same period in 1951.

The Hudson Coal Co. and subsidies—1952, deficit of $1,027,663; 1951, net income of $868,171.

Lehigh Coal & Navigation Co. and subsidiaries—1952 net of $1,240,704, up 15% over the 1951 net of $1,079,986; for operations of the Lehigh Navigation Coal Co., "results for the 9-mo period are 37% ahead of this time last year," with sales of $22,400,000, compared with $21,400,000 last year. Dividend of 35¢ declared as payable in December brings year's total to 70¢, the 72nd consecutive year the parent company has paid dividends.

Pennsylvania Coal & Coke Corp.—1952 net, $171,317, or $1.03 a share; 1951, loss of $63,638.

West Kentucky Coal Co.—1952 net, $1,816,803, or $2.12 a share; 1951 net, $1,664,529, or $1.94 a share.

And For Your Information . . .

The first strike reported as a result of the contract requirement that the local's president be advised by the 18th of the month that welfare payments are up-to-date occurred in mid-November at two mines of the Berwind-White Coal Mining Co. in central Pennsylvania.

The Illinois Supreme Court Nov. 19 took under advisement a case brought by Midland Electric Coal Co. to test the validity of a Knox County zoning ordinance regulating strip mining. Its ruling is not expected before January.

Accident Prevention Certificates for 100% participation were presented by USBM officials last month to employees and management of the Monarch mine, Blue Diamond Coal Co.; No. 1 mine, Virginia Lee Coal Co.; and a mine of Consolidation Coal Co. (Ky.).

Three anthracite companies, Glen Alden, Hudson Coal and Lehigh Valley, announced Nov. 19 price increases ranging from 35¢ to $1.35 a ton, depending on size. The new prices are said to reflect in part the added mining costs from the $1.50 a day okayed by the WSB.

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New Mine Developments

Five Firms to Supply AEC Ohio Plants, 7 Million Tons Yearly

More than 7 million tons of coal annually will be supplied by five mining companies to feed the two large generating plants being built to power the new AEC atomic-energy facility in Pike County, Ohio, it was announced Nov. 14. Earlier, the Ohio Valley Electric Corp., a 15-company combine which will build and operate the power plants on the Ohio River, had announced that one would be located near Gallipolis, Ohio, and the other at Madison, Ind. Under the 15-yr contracts reported by Ohio Valley Electric, the North American Coal Co. and Pittsburgh Consolidation Coal Co. will each furnish 1,550,000 tons a year for the Gallipolis plant. The Madison plant will be supplied by Ayreshire Collieries Corp. and Sinclair Coal Co. with 1,780,000 tons annually each; and by the Green Coal Co., Owensboro, Ky., with 395,000 tons a year. Coal shipments are scheduled to begin in October, 1954, and are expected to total an estimated $25 million a year.

Alabama By-Products to Open Modern Million-Ton Mine

A fully mechanized mine with an annual capacity of 1,000,000 tons will be developed by Alabama By-Products Corp., Birmingham, Ala., primarily to supply substantial tonnages to the Alabama Power Co., Georgia Power Co. and Gulf Power Co., subsidiaries of The Southern Co., it was announced last month. The new property, which is expected to cost over $3 million and employ some 200 men, will mine the American seam, at Maxine, in west Jefferson County, on the company's acreage adjacent to the Warrior River. It is expected to reach normal operation by July, 1954, and will ship via a spur to be built by the L&N. Under the long-term contract negotiated with the Alabama Power Co., the utilities initially will purchase over a half-million tons annually and can increase their requirements to more than 1 million tons a year. Plans call for installation of full mechanical equipment, including continuous miners, and coal will be conveyed by belt to the surface. P. H. Neal, president of Alabama By-Products, pointing out that the new mine is one of the few large commercial properties opened in Alabama in recent years, said: "We feel confident that this is a definite step forward for commercial mining in Alabama." In commenting on his company's contract arrangements, Thomas W. Martin, board chairman of Alabama Power, stated that "perhaps additional coal in large volume beyond that supplied by Alabama By-Products Corp.'s new mine at Maxine may be purchased by the company from other commercial mines for use at the Barry generating plant" now under construction at Mobile.

Stonega Coke & Coal Plans $3 Million Modernization

According to reports, the $3 million loan recently negotiated by the Stonega Coke & Coal Co., Philadelphia, will be used by the company to modernize certain of its operations in Kentucky and Virginia and to develop new properties.

LC&N to Acquire Some Assets From Weston Dodson & Co.

A contract to acquire certain assets of Weston Dodson & Co., Bethlehem, Pa., in return for 273,000 shares of its stock was announced Oct. 22 by the Lehigh Coal & Navigation Co. Announcement of the arrangement, which is expected to be completed by the end of the year and is subject to approval by the SEC, followed shortly the announcement by Weston Dodson that it was acquiring the output of Lehigh Coal's Lansford colliery, which is to be known as Dodson colliery (*Coal Age*, November, p 154). In return for the 273,000 shares of stock, which are authorized but unissued, LC&N would receive quick assets, including cash, guaranteed receivables and stripping operations, worth an estimated $3,522,000. In addition to the long-term lease of the Lansford breaker, Weston Dodson would be financed by LC&N in the future. Lehigh Coal & Navigation is expected to benefit from the 1 million added tonnage to be handled at the Lansford breaker and from the increased shipments over its wholly owned subsidiary, the Lehigh & New England R. R.

Alabama Power to Spend $400,000 at Gorgas Mine

More than $400,000 will be spent by the Alabama Power Co. in the near future for equipment additions and other improvements at its Gorgas mine to reduce mining costs and further increase safety. At the same time, the new equipment is expected to increase output from the present 4,200 tpd to more than 4,500 tpd in 1953. Included in the program are underground haulage improvements, construction of a 650-ton raw-coal bin on the surface, additional screening facilities and purchase of various underground units, such as drop-bottom mine cars, shuttle cars, loading, cutting and roof-drill machines.

And For Your Information . . .

A large block of coal land north of Mt. Harris, Colo., has been leased by the Westvaco Co., a subsidiary of the Allied Foods Machinery Corp., according to a report from Tom Allen, Colorado chief coal mine inspector. The coal will be shipped to Pocatello, Idaho, for use in a phosphorus plant there and will be the first coal from the state to be used for chemical conversion.

The Mary Gail Coal Co., Manchester, Ky., reportedly opened last month its new No. 4 mine in Clay County. The property is expected to produce 1,200 to 1,500 tons daily and employ about 100 men.

A new deep mine with an anticipated output of 700 tpd recently was opened by the Bradford Smokeless Coal Co., Page, Va., shipping via the N&W.

As part of a $24,750,000 expansion program recently approved by the DPA for a tax write-off, the Weirton Steel Co. will construct a new coke plant of two 41-oven batteries, which will increase coal consumed by 2,000 tons every 24 hr. Also included are additional coal-handling facilities at the company's Ohio River docks, five coal barges, added conveyor and storage equipment.

A new 76-oven by-products coke battery will be built by the Youngstown Sheet & Tube Co. at its Campbell works. The new ovens, which will cost an estimated $10 million, will have a rated capacity of 1,250 tons of coke daily.

The Hope Coal Corp., a newly organized company, is planning to re-open and operate the old Bertha mine, reportedly consisting of 346 acres of deep coal in Jefferson Township, Washington County, Pa. Frank Slack, of Bulger, is president of the new company and John Antosh, of Westland, is vice president.

New Firm Seeks Go-Ahead For Coal Pipe Line

Hydraulic transport of coal through cross-country pipe line moved a step nearer realization in October when the newly organized Hydro Coal Transportation Co., Youngstown, Ohio, filed petitions for public-utility status with state agencies in Ohio.

Whether such a pipe line ever is built depends upon results of tests now being run by Hanna Coal Div., Pittsburgh Consolidation Coal Co., at its Georgetown properties, near Cadiz, Ohio. Rough estimates, not attributable to Hanna, now place the cost of pipe-line movement of coal at 1½c per ton per mile. Interested circles see possible savings of $1 per ton on Western Pennsylvania coal barged to E. Liverpool, Ohio, and moved from there by pipe line to Youngstown if certain problems can be solved. These problems are: (1) heavy capital investment; (2) reconciling optimum size of coal for pipe-line transportation with optimum size for coking ovens; and (3) water disposal at the discharge end of the pipe line.

Earlier plans of Pittsburgh Consolidation Coal Co. envisioned a 100-mi line. Plans of the Hydro Coal Transportation Co. call for about 30 mi of pipe line.

One of the known sponsors of the newly formed company is Youngstown Sheet & Tube Co., which has long been seeking a cheaper way of bringing coal from its mines in Western Pennsylvania to steel mills in Youngstown. Earlier, the steel company had shown more than passing interest in a proposed trans-state conveyor belt, which twice has been blocked by refusal of the state legislature to grant eminent domain.

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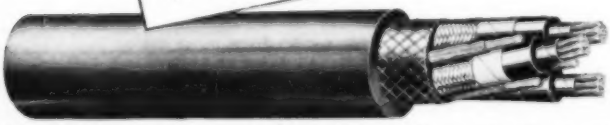

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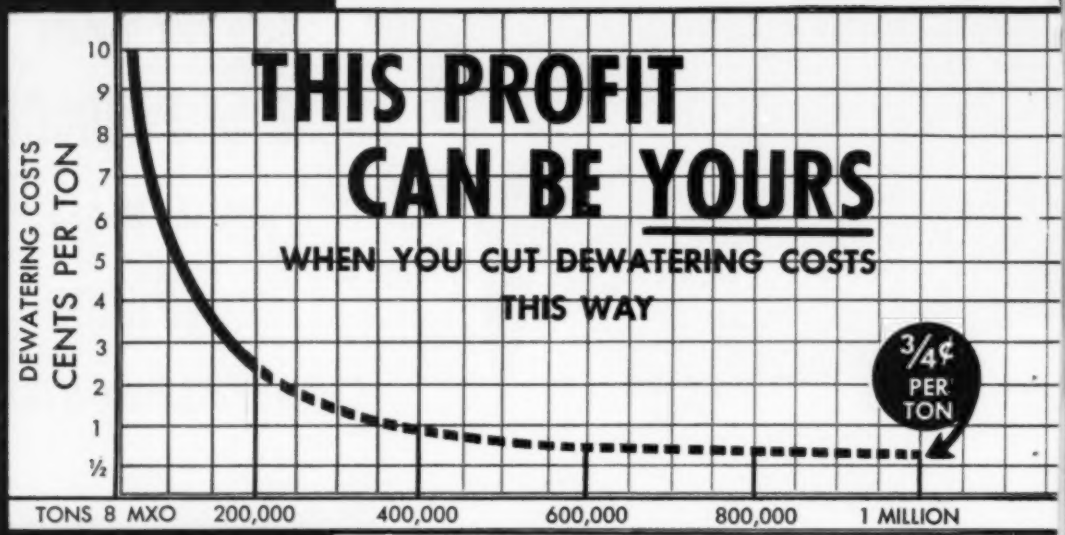

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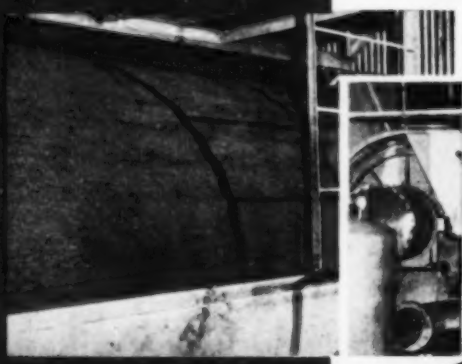

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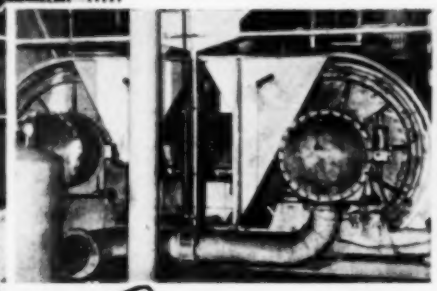

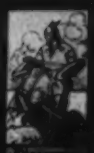

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Personal Notes

F. S. Follansbee Retires

FRANK S. FOLLANSBEE, chief engineer, Pittsburgh Coal Co., Div. Pittsburgh Consolidation Coal Co., Library, Pa., since 1938, retired Nov. 1, after reaching the age of 65. From 1923 until joining Pittsburgh Coal, he was chief engineer for the Koppers Coal Co. Mr. Follansbee will reside near Clearwater, Fla.

E. R. Cooper, manager of mines, Jones & Laughlin Steel Corp., California, Pa., has been named general manager of coal mines for the company, with headquarters in Pittsburgh. Before becoming manager of mines in 1947, Mr. Cooper was general superintendent of J&L's Vesta-Shannopin Div.

Two changes in personnel at the Wheelwright and Price mines of the Inland Steel Co., Wheelwright, Ky., have been announced by J. T. Parker, superintendent of coal properties. **Olney Collins** has been promoted from assistant mine foreman to safety inspector. **James Camp**, formerly assistant mine foreman, Price No. 2 mine, has been advanced to mine foreman, Price No. 1 mine.

Leo B. McTigue, chief electrician, Mine No. 31, Bethlehem Mines Corp., Nanty Glo, Pa., has retired after 38 years in the coal industry. **Elmer Dugan** has been appointed to succeed him as chief electrician. Strong on safety, Mr. McTigue chalked up a no-accident record during that period for both himself and the crews under his supervision. Mr. McTigue entered the mine in 1914, when it was known as the Nanty Glo Coal Co. and was owned by the Weaver-Coleman organization.

Philadelphia & Reading Coal & Iron Co., Philadelphia, Pa., has appointed **Dr. Robert J. Day** to the newly-created post of director of research, to forward the development of the company's long-range experimental and research program. A graduate of Union College in 1933 with a B.S. in chemistry, he received his PhD from Pennsylvania State College. Dr. Day, for the past 3 yr, has been engaged in fuels research for the Pittsburgh Consolidation Coal Co., and prior to that was a member of the staff of the Mineral Industries Experiment Station, at Penn State. **Irving S. Geer**, chief stripping inspector for the company since March, 1949, has been named assistant to the director of research, as a member of the president's staff attached to the Philadelphia office. Mr. Geer originally joined P&R in 1946 when he went with the Shen-Penn Production Co., a subsidiary.

John W. Overbeay, Staunton, Ill., has been appointed to the Illinois state mining board, succeeding **Walter P. Vesper**, resigned. Mr. Overbeay, employed at the No. 2 mine of the Superior Coal Co., Gillespie, has worked in coal mines for 48 yr.

Walter F. Schulten, vice president, Pittsburgh Consolidation Coal Co., Inc., Pittsburgh, was elected a director of the Pennsylvania State Chamber of Commerce at its annual meeting in Pittsburgh, Oct. 22.

Bituminous Coal Research, Inc., Pittsburgh, has named **Charles H. Marks** to its engineering staff at Columbus, under the direction of E. R. Kaiser, assistant director of research. Born in England, Mr. Marks received his master's degree in 1942 from Victoria University, Manchester, joined the Ministry of Fuel and Power, and was later appointed to the staff of the Technical Services Div., Powell-Duffryn, Ltd., where he became consulting mechanical engineer specializing in steam and fuels. In 1949, he became a U. S. citizen and joined Republic Coal & Coke Co., Chicago.

Obituaries

Alexander W. Laing Sr., 73, a director of the Wyatt Coal Co., MacAlpin Coal Co. and the Kanawha Mfg. Co., died Nov. 15 at his home in Charleston, W. Va., after a long illness. At the time of his death, Mr. Laing also was vice president of the Wyatt Coal Sales Co. and president of the Kanawha Valley Lumber Co., the Title Mortgage & Discount Co. and the Virginia Savings & Loan Co. He began his business career in 1897 as a bookkeeper for the Sun Coal & Coke Co. and except for a brief period had been affiliated with the coal industry ever since.

Isaac Forester Sr., 63, a foreman at the Pine Ridge colliery of the Hudson Coal Co., Wilkes-Barre, Pa., died Nov. 17 at the Wilkes-Barre General Hospital. Mr. Forester had been employed by Hudson Coal for 39 yr.

Claude L. Davis, 72, of Raven, Va., died Nov. 9 in a Richlands, Va., hospital, following a heart attack. Mr. Davis was the operator of several truck mines in the Raven area.

Harry H. Cleaveland Jr., 54, president of the Bituminous Casualty Corp., Rock Island, Ill., died Nov. 9 in Passavant Hospital, Chicago, where he had been undergoing treatment for several weeks.

Association Activities

Kentucky Mining Institute Elects New Officers

E. K. Newman, general manager of the Wisconsin Steel mines of the International Harvester Co., Benham, Ky., was elected president of the Kentucky Mining Institute at the annual meeting held Nov. 13-14 in Lexington, Ky. Mr. Newman succeeds F. P. Kerr, general manager, Eastern Coal Corp. Named vice presidents of the institute were: S. M. Cassidy, president, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidated Coal Co.; S. A. Fox, manager of southern mines, Blue Diamond Coal Co.; and Herman Knight, chief engineer, Bell & Zoller Coal & Mining Co. A. D. Sisk, chief of the Kentucky Department of Mines and Minerals, was re-elected secretary-treasurer. (*Editor's Note—A complete report of the papers and discussions at this meeting will appear in January Coal Age.*)

Smoke Abatement Group Meets

Continued emphasis on its time-tested policies of air-pollution control was reiterated by the Coal Producers' Committee for Smoke Abatement at its 11th annual meeting held in Cincinnati Nov. 7. Following papers presented by six leaders in the field, Ezra Van Horn, chairman of the Executive Committee, announced that the Executive Committee recommended "that the major programs and policies of the Committee be continued in full force and effect as, by experience over a considerable period of years, they have been proven successful," and the recommendation was unanimously approved. Speakers at the meeting were: K. C. Richmond, publisher, *Coal Heat;* C. F. Hardy, chief engineer, Appalachian Coals, Inc.; R. L. Ireland, president, Bituminous Coal Institute; E. D. Benton, director, Research and Fuel Engineering, Ohio Coal Association; Harold Nielsen, superintendent, Building Inspection, City of Dayton, Ohio; and H. B. Lammers, chairman and director of engineering of the Committee, who reviewed its activities during the past year. At the luncheon following the meeting, Julian E. Tobey, president of Appalachian Coals, Inc., was toastmaster and introduced D. S. Brown, vice president of the Cincinnati Gas & Electric Co., who spoke on "Power Problems Along the Ohio River."

Statistical Bureau Formed To Serve Two Coal Fields

Pocahontas-Winding Gulf operators have announced the establishment of Coal Statistical Bureau, Inc., with head-

(Continued on p. 142)

Merchandising—Top NCA Theme

In 35th Convention, National Coal Association . . .

Seeks New Ways to Merchandise Coal Hears Progress in Research

Scans Changes in Washington and Abroad Probes Chemicals and Utility Markets

NEW WAYS TO PROMOTE and merchandise bituminous coal topped all other subjects as well over 500 coal men and representatives of allied interests gathered in New York City Nov. 11-12 for the 35th anniversary convention and business meeting of the National Coal Association. At least five major addresses and numerous committee reports were directed at improved selling, wider promotion and new and growing markets for coal. The meeting was marked by the first convention appearance of Tom Pickett, former Congressman from Texas and newly elected executive vice president of the association. L. N. Thomas, president, Carbon Fuel Co., was elected as a new NCA director.

Richard L. Bowditch, president, C. H. Sprague & Son Co., New York City, presided at the opening session Tuesday morning and presented the following speakers: L. C. Campbell, NCA president and vice president, Eastern Gas & Fuel Associates; J. L. Kemmerer Jr., NCA treasurer and vice president, Wise Coal & Coke Co.; John D. Battle, assistant to NCA's president; Mr. Pickett; and John B. Veach, president, National Lumber Manufacturers' Association, major speaker at the session.

"A large share of responsibility for coal stability rests with those who make their living from coal."

In the long-term future, coal will replace an exhausting supply of oil and natural gas, Mr. Campbell predicted. But for today's operations there are problems that can be solved only by research, increased productivity and cooperation in all segments of the industry, he said. Pointing out that tremendous changes have taken place and now are underway in production, use, transportation and marketing of bituminous, he urged everyone, including workers and labor leaders, to take stock of his responsibility in speeding the industry's progress. "It remains to be seen whether the imposition of succeeding wage agreements to attain continuity of supply is warranted in the eyes of the customer if this is achieved by putting coal in a non-competitive position," he warned.

Washington will be changed a great deal after a new President is inaugurated in January, Mr. Battle said. He expressed the belief that the new climate will be helpful rather than discouraging and urged union leaders to read the verdict of the election and join hands in an effort to restore some of coal's markets. Continuing his report, Mr. Battle cited the increased percentage depletion allowance as a substantial gain for the industry.

"It is not possible to expect a rapid and entire relinquishment of government regulation."

"The one thing that affects your business more than anything else is the federal government," Mr. Pickett declared. "A change of faces does not change the impact of the government on your affairs but it does create new problems for your staff. We must make our own readjustments," he said. He explained that international relationships have far too much impact on the domestic economy to bring a quick end to government supervision and control, and warned that NCA must continue to press coal's needs upon federal administrators and agencies. "Your staff will do its utmost," he pledged. "We ask for reasonable and equitable treatment at the hands of the government. If the Nation ever suffers from lack of its basic fuel, it will be the fault of others than coal's leaders," he said.

"There is a great job for our associations to do, but it is going to take money and brains to do it."

"We all have the same general problems to face, whether we are trying to save markets as in coal and lumber or gain new markets as in steel and aluminum," Mr. Veach said. Drawing parallels between the lumber and coal industries, he pointed out that both industries exploit national resources, both are made up of thousands of small producing units and both have severe competition within and without. Mr. Veach listed the following problems facing the lumber industry, together with steps that have been or are being taken to solve them (similar problems faced by coal but not cited by Mr. Veach, together with existing or proposed solutions for coal, appear in italics):

1. Research development and promotion—Until the 1930's, no advance in wood fastenings had been made since the invention of the common nail. Recognizing this problem, the National Lumber Manufacturers' Association organized an operating subsidiary to promote a new type of fastening—a ring connector. This subsidiary has grown substantially and its activities now embrace lumber sales promotion, engineering services, timber-structure designing, testing, product development, research and educational services. (*Some circles have proposed a similar Bituminous Coal Corp., briefly described on p 71 of this issue of COAL AGE, for research, development, promotion and sale of coal-burning equipment.*)

2. Building codes—Following World War I, many cities considered adoption of restrictive building codes that would have ruled out lumber completely. NLMA organized a Building Code Department, staffed by trained engineers, to oppose elimination of lumber where it could do a good job. (*Coal has had much the same problem with smoke ordinances and has made forward strides with the Air Pollution Control Association and the Coal Producers' Committee for Smoke Abatement.*)

3. Complete product utilization—Private industries have taken over development of processes for complete utilization of trees. (*In coal, at least one big company is developing processes for producing refined chemicals from coal.*)

4. Product improvement—NLMA now plans to launch a $5,000,000 Research Endowment Fund for improving lumber and lumber products. This research will be so costly that only an association can undertake it. (*Bituminous Coal Research and the Anthracite Institute are working on similar problems but with limited funds.*)

5. Maintaining markets—In steel and aluminum, which compete with wood, large integrated single marketing units put the small-unit lumber industry at a disadvantage. NLMA now is shaping up a comprehensive long-range publicity program that will seek public preference for wood. The big obstacle is the unwillingness of the rugged individualists in lumber to spend the money needed to protect their investment. (*Coal's problem is much the same; that is, facing up to the integrated merchandising programs of oil and gas companies. BCI is the industry's agency for creating preference for coal.*)

6. Developing new markets—With new products daily being developed from wood, technically trained salesmen are a big need. NLMA hopes to develop a sales training program under university sponsorship. (*Producer, shipper and retailer interests in coal are developing plans cooperatively to train better salesmen. Some of these plans are revealed later in this meeting report.*)

"There has been a steady growth and cumulative gain in the effectiveness of BCI's program."

Though there has been a steady gain in favorable public opinion of coal through the program of Bituminous Coal

INDUSTRY MEETING—
A Special COAL AGE
Staff-Written Report

Institute, "Neither the coal industry nor any other industry ever will achieve complete immunity from attack and misrepresentation," said Ralph C. Mulligan, BCI director, at the Tuesday afternoon session, with R. D. Stockdale, vice president, Red Jacket Coal Co., presiding. Other speakers at this session were: R. L. Ireland, chairman, executive committee, Pittsburgh Consolidation Coal Co.; C. H. Griffith, president, Southern Coal & Coke Co.; Dr. Paul Brown, associate professor of marketing, Ohio State University; Dr. A. A. Potter, president, Bituminous Coal Research, Inc.; and W. L. Cisler, president, Detroit Edison Co., whose address was read by Arthur Griswold, assistant to the president.

BCI achievements in the past year include the following, Mr. Mulligan stated:

1. A new emphasis in BCI advertising on the merits of coal and modern coal-burning equipment; in other words, product promotion rather than institutional advertising.

2. Publication of the 1952 edition of *Bituminous Coal Annual*, first-run copies of which were distributed at the meeting.

3. Successful launching of the new color film, "Powering America's Progress," and continued bookings for an earlier black-and-white film, "The Magic of Coal," among schools and service clubs.

4. Participation in the recent nationwide Production for Freedom observance, spearheaded by electric-utility companies and aimed at publicizing the benefits of free enterprise.

5. Distribution of some 814,000 pieces of printed matter in response to about 73,000 requests from teachers and students.

6. Filling 268 speaking engagements before clubs and various other groups through the Speakers' Bureau.

"Coal Heating Service Division's field staff is now doing sales engineering."

NCA's Product Promotion Committee is a coordinating group which, in the interest of selling more coal and pleasing more customers, directs its attention at BCI, BCR, NCA's Marketing Committee, the Bureau of Coal Economics and the Air Purification Committee, said Mr. Ireland, reporting as chairman of the NCA Product Promotion Committee. The committee has divided itself into five task forces aimed at: (1) liaison with the American Retail Coal Association, (2) coordination of BCR projects with retailers' needs, (3) evolution of a training program for coal salesmen, (4) solution of engineering problems in a way that will be satisfactory to competing coal producers, and (5) promotion of a new type of Coal Heating Service contract.

The most important change that has taken place in CHS's field staff is that the men now are doing sales engineering, Mr. Griffith reported, speaking as chairman of the NCA Marketing Committee. At the outset, Mr. Griffith corrected two mistaken impressions about the Marketing Committee and its work by explaining that his committee and CHS support all bituminous sold by retailers and by pointing out that field work is carried on by seven regional managers who work from their homes and travel in personal cars or by public transportation.

Citing examples of sales engineering at work, Mr. Griffith said that CHS field men are aiming at prevention of changes from coal to other fuels, as well as at putting coal into new building projects. He also explained operation of CHS's new Commercial and Small Industrial Plant Modernization Program, which seeks to help retailers, shippers and equipment manufacturers sell coal and coal-fired boiler equipment. He urged that coal producers and shippers throw their strength behind promotion of the program, especially through their salesmen.

Finally, Mr. Griffiths said, the Market-

(Continued on p 156)

Exporter Highlights

Annual Meeting of the Coal Exporters' Association of the United States, Inc.

Place: New York City . . . *Date:* November 10

REPORT OF THE PRESIDENT

John S. Routh, association president and president, Routh Coal Corp.—Overseas exports of American coal for 1952 will total approximately 28,000,000 tons. Licensing restrictions, imposed Nov. 1, 1951, because of the increasing movements of coal to Europe, were lifted April 1, 1952, on the initiative of our government. All government agencies have been cooperative.

EXECUTIVE SECRETARY'S REPORT

F. F. Estes, executive secretary of the association—In the first 8 mo of this year, overseas exports totaled 20,872,132 tons, equal to 6.9% of total bituminous production and 3.2% of anthracite production. Factors affecting the outlook for the remainder of the year are: (1) winter weather in Europe; (2) industrial production in Europe; (3) increases in European coal output; (4) availability of free dollars and MSA funds; (5) stability of South American markets; and (6) requirements of steel and other industries in Japan and the Near East. Tonnage in 1953 probably will exceed 20,000,000 tons.

THE SCHUMAN PLAN

G. H. Craig, acting assistant director for supply, Mutual Security Agency—The Schuman Plan is a step toward development of a high-level but flexible productive capacity that will enable European nations to meet peaks in demand as they occur. Elimination of national boundaries, as far as movement of steel and coal is concerned, is one of the aims of the Schuman Plan. There need be no fears that a cartel will develop out of the plan or that prices will be rigged or fixed. In fact, the plan should broaden competition. But Schuman Plan or no Schuman Plan, some qualities of coal will continue in short supply whatever Europe's production is.

GOVERNMENT RELATIONS

D. T. Buckley, assistant to the president, Castner, Curran & Bullitt, Inc.—Election results mean a continued concern with international affairs and aid to Europe. There is a world-wide shortage of quality coals and there is no likelihood that the nations of the world, outside the United States, can produce enough coal for their own needs. Though there is a chance that some European nations might switch to an oil economy, good-quality coal still is their most economical fuel.

TRANSPORTATION

W. P. Anderson, Maritime Coal & Coke Co.—The following were offered as recommendations for activity in the year ahead: (1) abolition of the constructive arrival points or an extra two days' time allowed on cars held at these points; (2) a return to the former basis of calculating debit days; (3) petition to the Interstate Commerce Commission for a separation of dumping charges at Baltimore and Philadelphia; (4) abolition of the charge for trimming; and (5) dissemination of information about left-over quantities of coal at the piers.

NATIONAL SHIPPING AUTHORITY

C. M. McGuire, director, National Shipping Authority—In one year's time, ending in April, 1952, there was an average of almost three sailings per day of American ships carrying full cargoes of coal to Europe and other continents. This totals up to 1,054 NSA sailings that moved 10,090,783 long tons. This tonnage was a little more than one-fourth of the 38,000,000 tons of overseas movements of coal from the United States.

LIAISON WITH EUROPE

The convention adopted a resolution calling for a representative of the association to be named to act as liaison agent between coal exporters in the United States and approved coal agencies in Europe.

NEW OFFICERS

President—S. Pemberton Hutchinson Jr., General Coal Co., Philadelphia, Pa.

Vice president—A. F. Kempe, Seneca Coal & Iron Corp., New York City.

Modern Mining Illinois Theme

Production, transportation, preparation and safety feature technical sessions at 60th annual meeting of the Illinois Mining Institute.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

CONVEYOR-BELT DESIGN, mechanized mining, preparation, man trips and auger mining were the topics at the 60th annual meeting of the Illinois Mining Institute, held at Springfield, Ill., Oct. 24. At the business session, the following were elected as officers for the coming year:

President—William Bolt, Pawnee, Ill., succeeding Clayton G. Ball, Paul Weir Co., Chicago.

Vice President—H. L. Walker, head, department of mining engineering, University of Illinois, Urbana, Ill.

Secretary-Treasurer (re-elected)—B. E. Schonthal, B. E. Schonthal & Co., Chicago.

Executive Board—Stuart Colnon, Freeman Coal Mining Corp.; J. J. Foster, Chicago, Wilmington & Franklin Coal Co.; H. C. Livingston, Truax-Traer Coal Co.; George C. McFadden, Carmac Coal Corp.; and R. H. Swallow, Fairview Collieries Corp.

Prof. Walker reported that mining enrollment was up slightly at the university, and that 14 mining scholarships were in effect at the present time. M. D. Cooper, educational division, National Coal Association, expressed the hope that in the future all companies producing a half million tons or more would provide at least one scholarship in their state mining schools.

BETTER CONVEYOR BELTS

The use and advantages of cotton-nylon and Ustex-treated cotton-nylon conveyor belts was the subject of the first paper at the morning technical session, with Ivan A. Given, editor, *Coal Age*, presiding. The author was H. E. Pruner, belting engineer, U. S. Rubber Co., Chicago.

Reviewing the history of belt-conveyor use in coal mining, Mr. Pruner pointed out that at the end of 1950 a total of 5,175,000 ft of conveyor belt was in use in coal mining, including: underground, 3,100,000; slope, 325,000; cleaning plants and tipples, 1,500,000; stripping and overland, 220,000 ft. Some 250 mi of belting has been installed since 1950, making the total today 1,250 mi.

Following the development of 42- and 48-oz duck belts, Mr. Pruner continued, U. S. Rubber began an investigation of new belting materials. Of these new materials Ustex cotton-nylon provides the highest rating. It is accompanied by untreated cotton-nylon fabrics to provide five different constructions for varying services.

Ustex treatment is both chemical and mechanical in nature, and increases density, orients fibers and changes the fibers chemically to produce a 70% stronger material with 50% lower elongation and improved aging properties. This treated cotton then is woven in a special loom with nylon after which belt construction is substantially the same.

A Ustex cotton-nylon belt was installed in the Iron Range in 1949, Mr. Pruner reported, and in 4 yr of operation handled 5,100,000 tons of ore. In the spring of 1952 a 200-ft section was returned to the factory for analysis. It showed very little aging, with practically no reduction in adhesion of covers or between plies.

(Continued on p 152)

ON THE JOB, mobile classroom (left) takes training equipment right to pit mouth for miner training. In right photo, Gov. Frank J. Lausche of Ohio (center) examines safety lamp shown by Bennett Ferguson (left), mobile classroom instructor, and U. G. Carter, Mining Extension Service, W. Va. State College.

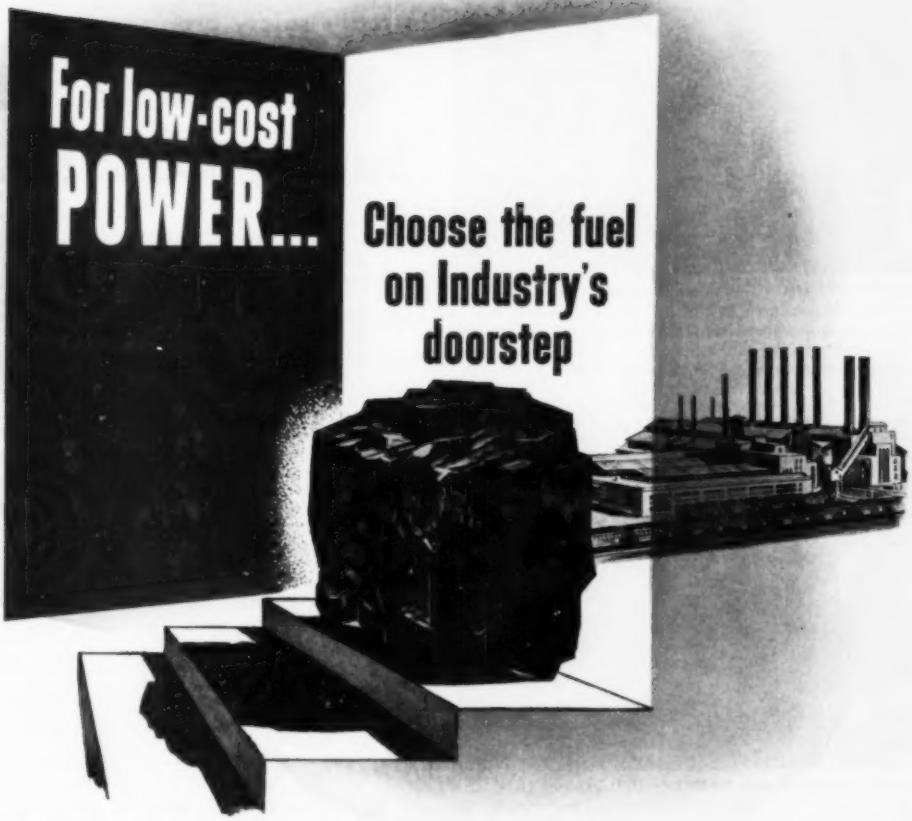
Mobile Class Sparks Miner Training

A CLASSROOM on wheels is fast proving its value as a teaching aid among West Virginia coal miners. Equipped and started on its journeys a little more than a year ago by the Mining Extension Service, West Virginia State College, Institute, W. Va., the mobile unit in its first 2 mo of operation conducted classes at eight mining operations, providing a total of 256 hr of training to 210 men, plus added information and interviews to 128 foremen and other mine officials.

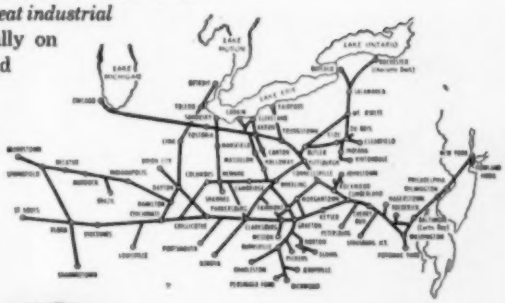
For 6 mo of the year, instruction is offered at mines. During the fall and winter, the mobile class visits high schools where mining is taught, providing lesson planning for teachers and demonstrations of mining equipment.

Equipment of the teaching truck includes fan, anemometer, safety lamps, gas box, methane-filled cylinders, hydrogen-sulphide and carbon-monoxide detectors, a motion-picture projector and teaching materials for community education. These last include leaflets and charts showing job classifications in coal mining, duties and pay of coal miners, history of coal and its uses, sources of scholarships for miners' children, and safety procedures.

The mobile classroom and its operations are fully described in a leaflet, "The Mobile Class—A Modern Approach to Better Teaching," prepared by U. G. Carter, director, Mining Extension Service. It is free upon request.



Coal is where you find it. Fortunately, however, a large share of the nation's operating Bituminous mines are located in Baltimore & Ohio territory—*economically accessible to America's great industrial plants.* The Bituminous mined here—practically on Industry's doorstep—is of excellent quality and in wide variety; whatever your specific need, there are B&O coals to meet it. Furthermore, the supply is *inexhaustible*—you can count on an *unlimited* reserve of B&O Bituminous, even in emergencies, for centuries to come.



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BITUMINOUS COALS FOR EVERY PURPOSE

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BALTIMORE & OHIO RAILROAD

Constantly *doing things*—better!

SAFETY TRAINING—Charles Kaczinski (left), District 1, UMWA, Wilkes-Barre, Pa.; F. T. Powers, Maryland Bureau of Mines, Westernport, Md.; A. G. Gossard, Snow Hill Coal Corp., Terre Haute, Ind.; J. W. Pero, Pochontas Fuel Co., Bluefield, W. Va.; and S. H. Mooney, Woodward Iron Co., Woodward, Ala.

ROOF CONTROL AND SAFETY—G. B. Jackson (left), Carbon College, Price, Utah; L. H. Johnson, Peabody Coal Co., Taylorville, Ill.; J. V. Berry, Bethlehem Mines Corp., Johnstown, Pa.; I. P. Bradley C. A. Hughes & Co., Cresson, Pa.; and J. L. Shores, Alabama Power Co., Birmingham, Ala.

Review of milestones and roadblocks in coal's safety progress marks . . .

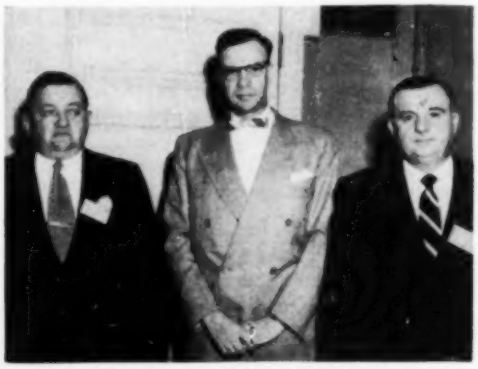
40th National Safety Congress

Benefits of safety training and problems of roof control, ventilation and rock dusting are features of Coal-Mining Section meetings attended by over 100 safety-minded coal men.

THE REAL BENEFITS of good safety training, the triumphs and continuing problems of controlling roof in room-and-pillar and longwall mining, procedures and costs attending the effective suppression of explosive coal dust, the applicability of dry dust collectors to remove the health hazards in rock drilling and recommendations for better ventilation were themes of speakers at meetings of the Coal Mining Section, National Safety Council, at Chicago, Oct. 20-23.

Over 100 delegates from the coal industry participating in the 40th annual National Safety Congress also elected section officers for the coming year, as follows: J. V. Berry, safety engineer, Bethlehem Collieries Co., Johnstown, Pa., general chairman; J. M. Reid, general manager, The Hudson Coal Co., Scranton, Pa., first vice chairman; William Schuster, safety manager, Hanna Coal Co., Div. Pittsburgh Consolidation Coal Co., St. Clairsville, Ohio, second vice chairman, and H. F. Weaver, acting chief, coal-mine inspection branch, U. S. Bureau of Mines, Washington, D. C., re-elected secretary, G. G.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report



VENTILATION AND DUST CONTROL—C. E. Linkous (left), Island Creek Coal Co., Holden, W. Va.; S. M. Cassidy, Consolidation Coal Co. (Ky.), Jenkins, Ky.; E. B. Nelson, Tennessee Coal & Iron Div., U. S. Steel Co., Fairfield, Ala.; L. B. Berger, U. S. Bureau of Mines, Pittsburgh, Pa.; and J. M. Reid, The Hudson Coal Co., Scranton, Pa.

LONGWALLING AND VENILATION (right photo)—H. V. Richmond (left), Illinois Department of Mines, Pana, Ill.; D. S. Kingery, haulage safety section, U. S. Bureau of Mines, Washington, D. C.; and R. T. Todhunter Jr., Barnes & Tucker Co., Barnesboro, Pa.

Grieve continues as the National Safety Council's representative to the Coal Mining Section.

At the opening session on Monday, subjects and speakers were: "How the Bureau of Mines Accident Prevention Course for Mine Officials Has Benefited Our Company," by **J. W. Pero,** production engineer, Pocahontas Fuel Co., Bluefield, W. Va.; "Benefits of a Safety Campaign," by **A. G. Gossard,** vice president and general manager, Snow Hill Coal Corp., Terre Haute, Ind.; "Practical Instruction in the Use of Gas Detection Equipment," by **Frank T. Powers,** director, Maryland Bureau of Mines, Westernport, Md.; and "Results of a Survey of Mineworkers' Views on Safety," by **Charles Kaczinski,** safety director, District 1, United Mine Workers of America, Wilkes-Barre, Pa., and **M. J. Kosik,** secretary, Anthracite Board of Conciliation, Hazleton, Pa. Stanley H. Mooney, safety director, Woodward Iron Co., Woodward, Ala., presided.

TRAINING CUTS FREQUENCY RATE

Reporting a company-wide reduction in the accident-frequency rate as a tangible result of taking advantage of good accident-prevention training, Mr. Pero credited the Bureau of Mines course for mine officials as a major factor in reversing his company's discouraging safety trend in the postwar years. Although management had provided all possible safeguards, accidents continued to occur and the frequency trend was upward, Mr. Pero said. A comprehensive study of the company's accident reports, lost-time or otherwise, led Pocahontas Fuel officials to the conclusion that almost all accidents resulted from thoughtless actions of either the injured worker or his buddy, lack of know-how in safe methods of performing mining duties or lack of proper instruction on the part of supervisors. Few, if any, accidents resulted from lack of machine guards or other physical safeguards.

Taking the view that the natural approach to better safety is through the foremen, the company decided to provide them with tools for doing the safety job in the form of a course of instruction, with USBM personnel as instructors. Consequently all bosses, from mine superintendents down, completed the 40-hr initial course and many participated in a refresher course. The initial course was completed on March 6, 1949, and in the ensuing 3 yr, the frequency rate dropped from 89.70 to slightly over 30, Mr. Pero reported. Also in this period, there were 32 occasions when individual mines of the company operated for a month without a lost-time injury. Among the benefits of such training, Mr. Pero said, are improved working practices and more suggestions as a result of interest in the training conferences, increased safety-consciousness among the officials and workmen and realization by the foremen that they now have effective safety tools to work with.

In conclusion, Mr. Pero declared, "My personal observation is that the material in this course is applicable in all bituminous and many anthracite mines, and the benefits to be derived from it far exceed those which can be obtained by enacting any number of mine-safety acts and code revisions."

SAFETY CAMPAIGNS PAY OFF

To differentiate, a safety campaign is only the propaganda arm of a safety program, but such campaigns are vital if the over-all safety program is to be kept alive and functioning, Mr. Gossard said, in describing personal experience concerning the value of a properly developed and vigorously executed campaign. Production and costs need not suffer adversely when the emphasis is on safety. To the contrary, Mr. Gossard pointed out that at one mine under his supervision, production was raised from 3,900 tpd to 4,600 tpd while compensations costs fell from 9c per ton to less than 2c per ton.

In getting such a campaign started, however, be certain that the initial steps are logical so that early mistakes will not doom the program to failure, Mr. Gossard cautioned. Early procedures that are perfectly logical at one mine or company may not apply with the personnel at another mine or company. Start campaigns on a small basis at a higher level, Mr. Gossard suggested, thus getting the official family in the campaign frame of mind. The officials should participate in the planning phases, so that they may become conditioned to the campaign and placed in a better position to condition their men.

Study the men to discover the safety approach they will respond to, consider safety as it applies to each mine and apply the Golden Rule, Mr. Gossard concluded.

TEACHING GAS DETECTION

Following several recent ignitions of methane in Maryland coal mines, the assistance of the federal Bureau of Mines was solicited to set up a program for training mine workers in proper gas-detection methods, Mr. Powers pointed out in setting the stage for his description of the new training techniques. The situation arose because most Maryland mines had been classified as non-gassy. In fact, there had been no methane explosions in the state since mining began in 1782. But an explosion that killed three men in August, 1948, resulted in revision of the state mining laws and it became necessary for supervisors to submit to tests to meet the new requirements regarding methane detection, Mr. Powers related. D. S. Kingery, mining engineer, and F. D. Baker, coal-mine inspector, USBM, were assigned by the Bureau to work with Maryland officials in setting up the training procedures.

The equipment in the first laboratory, which was built in 1949 at the State Teachers College, Frostburg, Md., consisted of a number of testing boxes, one for each three or four men, and a large walk-in gallery; Bunsen burners to deplete the oxygen in the testing chambers, simulating black-damp; and several permissible flame safety lamps. A sensitive permissible methane detector was provided to check the accuracy of the test readings. The course of instruction consisted of lectures, demonstrations and actual practice in gas detection. This set-up is later supplemented by a portable laboratory.

In defining the goal of the program, Mr. Powers pointed out that the instructor must provide "ample time to insure that each student has an opportunity to develop technique and confidence in his ability to detect the presence of noxious or explosive mine gases."

MINERS' VIEWS ON SAFETY

Mr. Kaczinski presented the paper on mineworkers' views concerning safety, which was jointly authorized by Mr. Kaczinski and M. J. Kosik, secretary, Anthracite Board of Conciliation, Hazleton, Pa. The full text of the paper appeared in *Coal Age*, November, 1952, p 81.

At the Tuesday session, speakers and their subjects were: **George B. Jackson,** instructor and consultant in coal mining, Carbon College, Price, Utah, on "Problems of Bumps and Outbrusts in American Coal Mines"; **L. H. Johnson,** safety engineer, Peabody Coal Co., Taylorville, Ill., on "Roof-Bolting With Conventional Mining Equipment"; **James L. Shores,** safety manager, speaking for **Milton H. Fies,** vice president—coal operations, Alabama Power Co., Birmingham, Ala., on "Roof Bolting With Continuous Mining Machines"; and **Ira P. Bradley,** general superintendent, C. A. Hughes & Co., Cresson, Pa., on "Responsibility for Roof-Fall Accidents." J. V. Berry was session chairman.

PREVENTING OUTBURSTS

After outlining the circumstances surrounding several major bumps or outbursts in Utah coal mines, Mr. Jackson declared his agreement with the theory that such phenomena, at least in Utah, are the result of great pressures exerted on pillars by the accumulated weight of strong strata. When the accumulated

(Continued on p 178)

Annual Editorial Index Appears in This Issue

For your convenience, *Coal Age's* annual index covering editorial material in all 1952 issues is bound into the rear of this issue. To help you find the information you may be seeking, editorial articles published during the year are classified by subject, with additional listings by mine, company and author.

Fuel Men Study Better Coal Use

Themes of 15th Joint AIME-ASME Conference:

Improved home equipment and better oil-treatment

More efficient industrial utilization of coal

Better preparation to promote wider acceptance

INDUSTRY MEETING—

A Special COAL AGE

Staff-Written Report

REPORTS OF RECENT ADVANCES in the preparation of coal and results of studies in its more effective utilization were features of the 15th annual Fuels Conference sponsored by the Fuels Division, ASME, and the Coal Division, AIME, Philadelphia, Oct. 30-31.

Other features of the 2-day program, which was attended by more than 225 delegates, included the presentation of the Percy Nicholls award for 1952 to Dr. H. F. Yancey, supervising engineer, U. S. Bureau of Mines, Seattle, Wash.; a showing of the new BCI film, "Powering America's Progress," at the Thursday luncheon; and a Thursday evening talk by Dr. A. A. Potter, president, Bituminous Coal Research, Inc.

In commenting on America's greatness, Dr. Potter pointed out that the nation was settled by people of great adaptability, capable of exercising imagination tempered by judgment. Urging his listeners to participate more fully in political matters, Dr. Potter declared that such activity is necessary if the individual is to remain on a pedestal and if America's strength is to be properly directed.

The opening session on Thursday morning was devoted to a domestic-stoker symposium with R. J. Grace, Division of Fuel Technology, Pennsylvania State College, State College, Pa., reporting on operating experience with two types of preoxidizing stokers, and R. I. Bush, Coal Div., Eastern Gas & Fuel Associates, reporting on studies in draft arrangements for domestic stokers. Co-authors with Mr. Grace were T. S. Spicer and C. C. Wright, also of Penn State; and co-author with Mr. Bush was C. H. Sawyer, Coal Div., EG&FA. H. A. Herder, Sahara Coal Co., Chicago, Ill., and C. F. Hardy, Appalachian Coals, Inc., Cincinnati, Ohio, were chairmen.

Explaining the principle of preoxidation as the introduction of part of the total air through the coal-feed mechanism of the stoker to eliminate coke-tree formation, Mr. Grace reported that one of the units in a 14-room house reduced fuel consumption from 24 tons per year with hand firing to 15 tons per year after the stoker was installed. The home is occupied by 14 people and the unit also heats service water for this group.

Another installation in a 7-room home required only 9.1 tons in the 1951-52 heating season (6,152 degree-days). This is about a 26% reduction in coal consumption over previous hand-firing methods in the same home. In the 7-room home, the cost of service water during the summer months averages about 11c per day or $3.30 per month. In the 14-room home, service water at 120 F costs about 14.6c per day for 10 people.

The smaller home is flanked by two similar dwellings using oil for heating. The coal bill for the stoker-equipped home is about $106 per year, while oil for heating the similar home costs $250 in one and $216 in the other.

In the discussion, it was brought out that the stokers are not production models but were among a group of 25 placed in the field for testing.

In reporting on comprehensive studies into draft arrangements for domestic stokers, Mr. Bush listed the functions of draft controls as providing for quick pick-up when heat is demanded, controlling overrun when the demand is satisfied and permitting adequate air to move through the fuel bed to carry away the products of combustion. For controlling overrun, Mr. Bush suggests a heat-anticipating thermostat or an interrupter timer. These can be set to stop operation previous to satisfying the demand so that the overrun heat will fill out the demand. Either method is better than setting back the thermostat at night.

Generally speaking, a low draft is better when burning softer coals to reduce burn-away during off periods, and a somewhat higher draft is necessary with harder caking coals to maintain ignition. Mr. Bush concluded that the location of the turn damper, if one is used with a balanced damper, should be between the furnace and the balanced damper to provide quicker load pick-up and make more useable heat available.

At the afternoon session, T. B. Richards, superintendent, Sunbury steam-electric station, Pennsylvania Power & Light Co., Shamokin Dam, Pa., described the use of pulverized anthracite in the station's boilers, and Dr. R. C. Johnson, vice president, Anthracite Institute, Wilkes-Barre, Pa., reported on initial experiments in burning large quantities of anthracite at slow burning rates in the coal bin. F. C. Messaros, American Engineering Co., Philadelphia, Pa., and S. L. Bunting, General Coal Co., Philadelphia, presided.

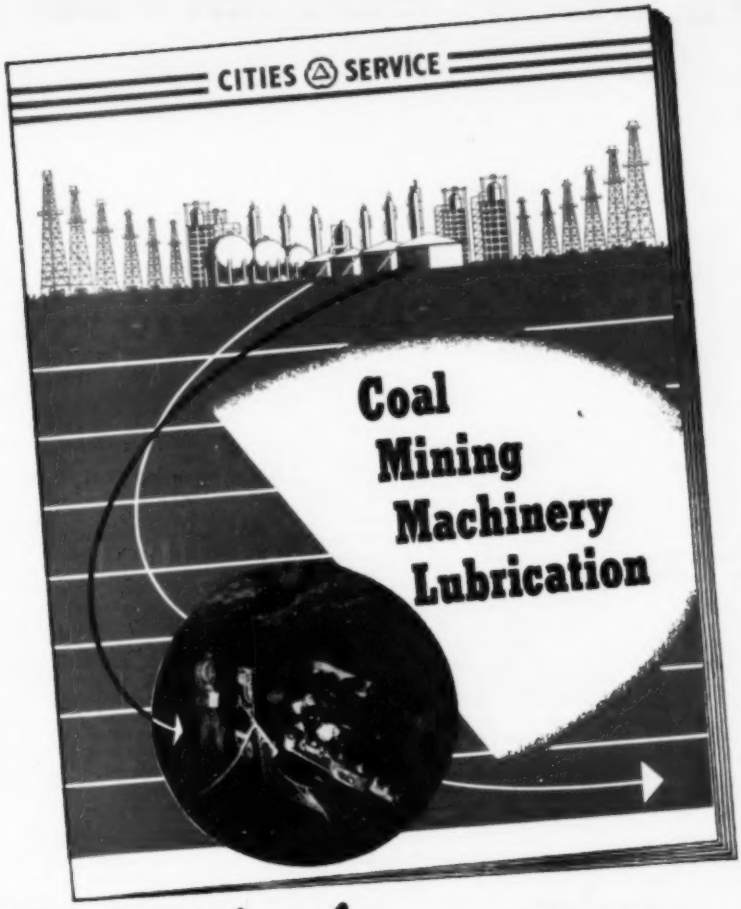
Designed to utilize the fine sizes of anthracite for generating steam, the new Sunbury station, after 3 yr of operation, exceeds the expectations of the designers in most respects, Mr. Richards declared, in describing some of the special features required in an anthracite-fueled generating facility. At Sunbury, Buckwheat 4 and 5 and some unprepared silt are used, the silt containing as much as 50% ash on occasion. In explaining the design features which were tailored to the fuel to be used, Mr. Richards pointed out that the high moisture content of the coal (15%) makes it necessary to have facilities for thawing frozen coal, adequate pulverizing capacity, blending facilities to permit the addition of bituminous coal with extremely wet anthracite and blockage-proof coal-handling equipment.

Furthermore, furnaces which are to burn low-volatile anthracite with its slow burning characteristics must be designed to provide a rich coal-air mixture, larger volume, secondary air to scrub the flame completely, and refractory-covered waterwalls in the ignition zone. Burning such high-ash fuels requires greater stress on effective dust collection, expanded ash-handling facilities and furnaces designed to minimize erosion. These added requirements make the capital cost of an anthracite plant somewhat higher than other types, but Mr. Richards pointed out that the plant is near the anthracite-producing region, thus making the operating

(Continued on p 170)

Fire Without Smoke

SIDEWALK THRONGS passing City Hall during Anti-Smoke Week in Philadelphia, Oct. 20-27, saw anthracite rice burning in a stoker without a whiff of smoke. They also saw ashes automatically carried away and discharged into tight-lidded containers for easy disposal. Behind the stoker (right), Harold J. Stoney, assistant to the Philadelphia service manager, Lehigh Navigation Coal Co., explains the operation to spectators while Jesse Lieberman (inside rope, left), industrial engineer for the city's Division of Air Pollution Control, watches show.



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W. Va. Groups Hold Joint Meet

Two-day sessions reveal the facts about . . .

Dry and wet cleaning

Avoiding rock bursts

Mining with the planer

Evaluating property and plant

WET AND DRY COAL CLEANING and rock bursts in coal mines were featured at the annual joint meeting of the West Virginia Coal Mining Institute and Central Appalachian Section, AIME, held Nov. 14 and 15 at the Greenbrier Hotel, White Sulphur Springs, W. Va. Factors controlling coal property values for investments and loans and results of experimental work with the German coal planer in a U. S. mine rounded out the 2-day session, attended by more than 175 members and guests.

James F. Trotter, president, West Virginia Coal Mining Institute, presided at the Friday luncheon and Fred K. Prosser, chairman, Central Appalachian Section, AIME, presided at the dinner held that evening. Gordon MacVean, president, National Mines Service Co., was toastmaster at the annual dinner. Harry Quenon, division manager, Eastern Gas & Fuel Associates, and C. R. Nailler, president, Christopher Coal Co., were co-chairmen of the Friday session. George R. Higinbotham, president, Consolidation Coal Co. (W. Va.), and C. H. Hodgson, Mine Safety Appliances Co., were co-chairmen of the Saturday session.

New officers of the West Virginia Coal Mining Institute elected for the coming year were: Arch Alexander, president; Harry Quenon, R. C. Luther, C. E. Hough, C. R. Nailler and George McCaa, vice presidents. J. J. Foster, Jesse Redyard, G. R. Higinbotham, C. R. Bourland and J. F. Trotter are the new executive board; and G. R. Spindler was reelected treasurer.

Incoming officers of the AIME Central Appalachian Section are: G. R. Spindler, chairman; G. R. Higinbotham, C. H. Hodgson and R. H. Hughes, vice chairmen. C. R. Bourland, H. O. Zimmerman and F. K. Prosser were elected to the executive committee, and C. T. Holland was re-elected secretary-treasurer.

In addressing the luncheon, Dr. Kenneth McFarland, educational consultant, General Motors Corp., Topeka, Kan., emphasized that despite our apparent prosperity there never was a time closer to moral failure than now. To solve our problems, he said, we must have a spiritual and moral rebirth.

John D. Coleman, president, National Society of Professional Engineers, discussed "Resources for Progress" at the annual dinner. He warned that now is the time to pause and survey what we can do to restore and conserve our resources. If we are to maintain our standard of living we must improve our techniques and utilization because we have changed from a "have" to a "have-not" nation.

Dry Cleaning Saves Fines

Preliminary engineering tests indicating that 53% of the raw coal and 80% of the clean product would be minus ⅜-in coal led management to select dry methods for cleaning because of the difficulty in recovering fines in wet-washing processes, declared W. J. Skewes, chief engineer, Pocahontas Fuel Co., Inc., Pocahontas, Va.

Designed and constructed to handle 700 tph of raw coal, the new Itman plant combines dense-media cleaning of 6x¼-in coal and dry-table cleaning of ¼x0 to produce a uniform high-quality product. Raw coal is separated into 6x¾ and ¾x0 products, the coarse coal going to the dense-media section and the fines to four Link-Belt Multi-Louvre driers.

Dried ¾x0 coal is separated into ¾x¼ and ¼x0 on four vibrating screens preparatory to cleaning. The finer product is delivered to nine 20-ton bins feeding cleaning units composed of a primary table, vibrating screen for separating the primary clean product at 6-mesh and secondary tables for cleaning the minus 6-mesh. Two bag-type dust collectors complete the unit. Nine of the units are used for producing clean coal, while the tenth prepares a middling product.

Close control over the final product is made possible through blending the slack in 24 bins prior to cleaning and by accurate automatic control of the driers, Mr. Skewes pointed out.

Wet Cleaning Cuts Losses

Producing a superior quality product with minimum manpower was the objective of management in planning the Tralee preparation plant, reported Percy Gillie, general manager of mines, Semet-Solvay Div., Allied Chemical & Dye Corp. In his paper, Mr. Gillie pointed out that the washing difficulty and requirements of a cleaning plant for processing mechanically mined Pocahontas No. 3 coal were unknown. Extensive mining and preparation tests indicated a difficult washing problem, requiring wet methods if the desired results were to be obtained with minimum loss of coal in the refuse.

Using tables and charts, Mr. Gillie illustrated the results obtained from the plant and explained how they were made possible. He also described several changes in original design which have increased plant efficiency.

Avoiding Rockbursts

Most of the roof problems stem from top which is too strong, according to C. T. Holland, head, Department of Mining Engineering, Virginia Polytechnic Institute, Blacksburg, Va. Defining a rock burst as a sudden bursting of a pillar with violent expulsion of material at the moment of burst, Prof. Holland said rock bursts occur in West Virginia, Kentucky, Virginia, Utah, Colorado, Washington and Pennsylvania anthracite. Conditions under which they generally occur are: (1) cover over 500 ft thick, (2) strong massive roof, generally sandstone or conglomerate within 10 to 15 ft of the coal and (3) relatively strong floor.

To prevent rock bursts, Prof. Holland said, operators should: (1) use long-range planning in mining, (2) practice clean pillar extraction, (3) develop pillars of uniform size and shape, (4) keep development openings as narrow as possible, (5) eliminate pillar points, (6) avoid development in a stressed area, (7) avoid slabbing pillars, (8) plan mining to eliminate removal of barrier pillars between robbed areas, (9) use open-end pillar methods and (10) consider using advancing longwall mining methods.

Evaluating Coal Property

Citing the performance of the coal industry in the past, Carel Robinson, Robinson & Robinson, Mining Engineers, said that the coal industry is basically healthy but some companies and mines are "sick." Many of these could be saved by careful examination and appraisal coupled with necessary changes, he added.

In making appraisals of mines, changes such as new equipment, improved preparation and abandonment of mining in certain areas often will be found necessary for cost reduction. The value of a property is its ability to make a profit among its competitors and not necessarily the book value of plant and equipment, Mr. Robinson explained.

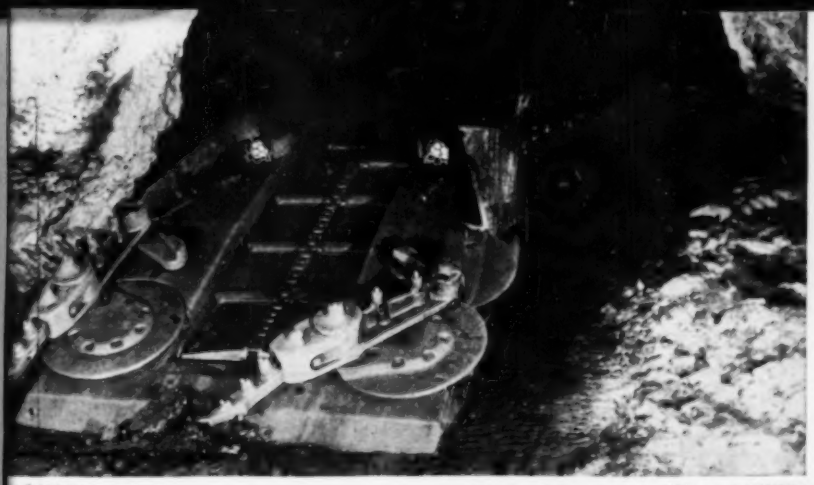
Using the Coal Planer

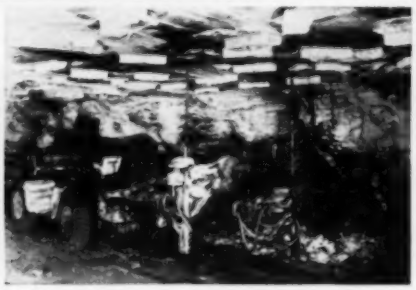
Prior to presenting his paper on "The German Coal Planer in Operation, Helen Plant, Eastern Gas & Fuel Associates," W. D. Hawley, general superintendent, Coal Div., EG&FA, presented a movie showing the construction and operation of the coal planer in a German mine.

Experience at the Stotesbury No. 11 mine, EG&FA, Helen, W. Va., indicates that the German machine has real possibilities in promoting higher productivity and higher recovery in thin seams (see *Coal Age*, November, p 76, for a detailed report on the unit).

Initial experimental work in the Pocahontas No. 4 seam has shown an increase in recovery and production per manshift as compared to conventional methods. The planer experiment was a cooperative project among EG&FA, the U. S. Bureau of Mines and Mining Progress, Inc., American agents for the German manufacturers, each partner contributing to the success of the experiment.

Award of the West Virginia Coal Mining Institute Scholarship for 1952 to Owen K. Ball, Clothier, W. Va., was announced at the meeting. Central Appalachian Section, AIME, scholarships winners named were: Fred H. Miller, Cowen, W. Va.; Clifford C. Suttle, Coeburn, Va.; and Daniel A. Penny, Pikeville, Ky.





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There's a corps of Standard Oil lubrication specialists throughout the Midwest. You'll find one located near your mine. Through special training and a lot of practical experience, this man has gained a working knowledge of lubrication that can mean real savings for you. To obtain his services, simply contact the nearest Standard Oil office. Discuss with him the savings you can make with such outstanding products as:

STANOIL Industrial Oils . . . Here's one line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants . . . On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

Here's versatile lubrication, plus!

• At a midwest mine, two grades of SUPERLA Mine Lubricants not only have handled successfully a wide variety of jobs but have proved superior in each application to special products previously used.

SUPERLA Mine Lubricant No. 00 has served for over three years in the gear cases and hydraulics of the mine's loaders. Despite hard operation of these machines, there have been no clutch failures, and clutch plates have remained free from carbon deposits. There have been no bearing failures. Hydraulic units have operated efficiently with no downtime for maintenance.

SUPERLA Mine Lubricant No. 4 has been used for over three years in loader gathering heads. On this punishing job, it has prevented any trouble caused by lubricant deterioration or breakdown. Bearing wear has been kept to a minimum.

Shuttle car lubrication and service in a roof bolting drill are among the uses of SUPERLA Mine Lubricants in this mine. The versatility of these products has simplified lubrication and the stocking of lubricants. It has eliminated the costly use of special-purpose oils and greases.

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricants

You'll find among the six grades of SUPERLA Mine Lubricants the right combination for successful lubrication of your loaders, cutting machines, shuttle cars, and related equipment. The Standard Oil lubrication specialist in your section of the Midwest will help you get the best possible results. You can contact him through your local Standard Oil Company (Indiana) office. Or write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

Speeds output, promotes safety -with continuous communication

BATTERY-POWERED MOBILE TELEPHONE

Assure direct, continuous communication between your central dispatcher and mobile units with General Electric carrier-current mobile telephones. With this improved, battery-powered, 2-way voice system you co-ordinate movement of locomotives, maintenance crews, supplies. Contact your nearest G-E Apparatus Sales Office or write for Bulletin GEA-5569 to General Electric Co., Sect. 663-33, Schenectady 5, N. Y.

GENERAL ELECTRIC

Associations . . . From p 130

quarters in the Appalachian Building, Bluefield, W. Va., to serve producers in the Pocahontas and Winding Gulf fields. The new organization will compile statistics on production and distribution of coal from those fields, estimated at more than 18 million tons annually. Walter J. Ott, formerly with the Boston Edison Co., and the former Delta Export Co., was named president in charge of the offices of the new organization. William Buery, president, Algoma Coal & Coke Co., is chairman of the board; Wake Walker, president, Sovereign Pocahontas Co., is secretary-treasurer; and Henry F. Warden, president, American Coal Co. of Allegany County, is vice president.

Kanawha Group Meets

Kanawha Coal Operators' Association held its annual meeting Oct. 16 in Charleston, W. Va. During the business session in the afternoon, the members heard talks by Tom Pickett, executive vice president, National Coal Association; Joseph E. Moody, president, Southern Coal Producers' Association; Herb Lammers, chairman of the Coal Producers Committee for Smoke Abatement; William Maddox, executive secretary of the Property Owners' Committee; R. C. Andrews, secretary, West Virginia Coal Association; and Robert Kelly, counsel of the Kanawha Association, who also was toastmaster at the banquet.

Hazard Operators Name Elben

M. K. Elben, Mayor of Hazard, Ky., and president of the Elben Coal Co., was elected president of the Hazard Coal Operators' Association at its annual meeting held in Lexington, Ky., Nov. 14. Other officers named included Finley Davis, president of Midland Coal Sales Co., as vice president; and W. B. Sturgill, secretary-treasurer. Main speakers during the session were: Joseph E. Moody, president, Southern Coal Producers' Association; Julian E. Tobey, president, Appalachian Coals, Inc.; and H. B. Lammers, chairman, Coal Producers' Committee for Smoke Abatement. Tom Pickett, executive vice president, National Coal Association, was the featured speaker at the banquet that evening.

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in October, as follows:

Goodman Mfg. Co.—Type 97-HC-30 belt conveyor; one 25/50-hp motor, 250 v, DC; Approval 2-877; Oct. 14.

Joy Mfg. Co.—Type DF-112/-113 hoist; one 10-hp motor, 220, 440 and 550 v, AC; Approvals 2-878 and 2-878A; Oct. 27.

Chicago Pneumatic Tool Co.—Type RBD 30 roof-bolting drill; two motors, 3 and 5 hp, 250 and 500 v, DC; Approvals 2-879 and 2-879A; Oct. 28.

J. H. Fletcher & Co.—Models CBA-2 and CBA-4 timbering and roof-drilling machines; one 10-hp motor, 250 v, DC; Approval 2-880; Oct. 30.

COMING MEETINGS

Coal Mining Institute of America: 66th annual meeting, Dec. 11-12, Hotel William Penn, Pittsburgh, Pa.

New Books for Coal Men

USBM Spurs Research

Annual Report of Research and Technologic Work on Coal, Fiscal Year 1951, by R. L. Brown and E. P. Carman. Here's the Bureau's yearly review of its research work. Highlights of the report deal with minable reserves of metallurgical coal, synthetic liquid fuels, safety, coal utilization and mining methods. *USBM, I. C. 7647. 81 pp. 8 x 10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.*

What Advertising Can Do

Tenth Annual Report of the Advertising Council. This is the story of what men with advertising and public-relations know-how have done in 10 yr to speed movements in the public and national interest. It tells how this voluntary group has helped with such projects as the blood-donor campaign, drives for better schools, community chest campaigns, civil defense, anti-inflation programs and a host of other public-spirited enterprises. *35 pp. 9 x 12-in; paper. Free, The Advertising Council, 25 West 45th St., New York 19.*

Better Welding

Weldability of Metals. This booklet, lifted out and reprinted from the big Procedure Handbook of Arc Welding Design and Practice, tells how to weld various carbon and alloy steels; copper, aluminum and nickel and their alloys; cast iron, forgings, galvanized steel, terne plate and enameling stock. It also discusses the principles and practice of hardsurfacing. *141 pp. 50¢, The Lincoln Electric Co., Cleveland 17, Ohio.*

Other Books and Booklets

Coal Deposits in the Deep River Field, Chatham, Lee and Moore Counties, N. C., by F. H. McIntosh, A. L. Toenges, J. J. Shields, W. A. Haley, T. R. Jolley and L. A. Turnbull. *USBM, Bulletin 515. 75¢, Supt. of Documents, Government Printing Office, Washington 25, D. C.*

Surface-Water Seepage Into Anthracite Mines in the Lackawanna Basin, Northern Field, by S. H. Ash, W. L. Eaton and R. H. Whaite. *USBM, Bulletin 518. 37 pp plus map. 8 x 10½-in; paper. 75¢ Supt. of Documents, Government Printing Office, Washington 25, D. C.*

COAL MEN ON THE JOB . . .

Union Pacific Coal Co., Rock Springs, Wyo.

FIRST-AID TEAM of the Winton (Wyo.) Girl Scouts performs for the experts: Dan F. McElhatten (left), judge; Tom Allen, Colorado chief mine inspector; J. J. Forbes, director of the USBM; and I. N. Bayless, president, U. P. Coal Co.

MacAlpin Coal Co., Raleigh County, West Virginia

FIRST SHIFT (top photo): R. F. Allen (seated, left), Saul Brown, Richard Adkins and Donald Brown, panel foremen; G. P. Henderson, slate foreman; Hugh Frame (standing, left), and Rossi Fox, panel foremen; C. J. Meadows, general assistant foreman; W. G. Mably, J. C. Shelton and G. G. Darnell, panel foremen; and G. F. Bane, general mine foreman.

SECOND SHIFT (lower photo): Chester Grubb (seated, left), panel foreman; Sam West, slate foreman; E. R. Hughes, general night foreman; F. A. Adkins, general assistant foreman; Ray Walters, panel foreman; Walter Pendry (standing, left), James Burnette, Fred Wenger, Carl Mooney and Millard Poe, panel foremen.

Works when you need it most -when trolley power fails

BATTERY-POWERED MOBILE TELEPHONE

Battery-powered and dust-tight, G-E mobile mine telephone equipment is extra valuable in emergencies. When trolley power fails and communication is most vital, the phones continue working dependably, while trolley line is intact.

Get full information. Contact your nearest G-E Apparatus Sales Office or write for Bulletin GEA-5569 to General Electric Co., Sect. 663-33, Schenectady 5, N. Y.

GENERAL ELECTRIC

Among the Manufacturers

Frank E. Briber Jr. has been named manager of Allis-Chalmers' newly formed crushing, milling and mining machinery section. Mr. Briber, who has been with Allis-Chalmers since 1946, was formerly manager of the crusher section. Other appointments announced in the process machinery department include: R. C. Edwards as engineer-in-charge of research and development; N. E. Croft, sales engineer-in-charge of the crusher group; C. A. Rowland, sales engineer-in-charge of the rod- and ball-milling group; E. M. Bolstad, sales engineer-in-charge of miscellaneous mining equipment and coordinator of projects for the mining industry; D. F. Carlson, product engineer of the pyroprocessing section; and A. J. Roubal, special engineer.

John L. McCaffrey, president of the International Harvester Co., Chicago, has announced acquisition of the stock of The Frank G. Hough Co., Libertyville, Ill., manufacturers of earthmoving, excavating and material-handling equipment, to "effectively supplement our current line of industrial power and earthmoving equipment. We will operate the Hough Co. as a wholly owned subsidiary, with no immediate change in the organization of the company," Mr. McCaffrey reported. "We feel we are particularly fortunate in having Mr. Frank G. Hough continue as president of the subsidiary company, directing the activities of the business which he has built up." The Hough Co. now has approximately 675 employees and includes a modern factory with 300,000 sq ft of floor space.

Dart Truck Co., Kansas City, Mo., has appointed Robert L. Wicker as assistant to the general manager, as part of its expansion program that includes the planning of a new factory to handle an increased volume of business. Mr. Wicker was previously general manager and vice president of the Wicker-Wood Equipment Co., Los Angeles and Sacramento, Calif., and formerly was with the Columbia Steel Co.

Richard H. Koehler has been appointed manager of the advertising and sales-promotion department of LeRoi Co., Milwaukee, replacing Guy Schrivner who has been appointed sales engineer in Michigan, Ohio, Indiana and Illinois after holding his former post since 1948. Mr. Koehler has been advertising manager of Sterns Magnetic, Inc., since December, 1948. The company also has reported the integration of its plant and industrial engineering departments under the supervision of Wesley A. Schaefer as manager of the new department, with Walter V. Sovitzky as chief industrial engineer.

Koehring Co., Milwaukee, has named John S. Conway, formerly general sales manager, as vice president in charge of sales, and John E. Chadwick, with the company since 1945, as sales manager. In his new post, Mr. Conway will fill the vacancy created earlier this year when Julien R. Steelman was named president of Koehring. Mr. Chadwick returns to Koehring, where he formerly was assistant sales manager, after serving for a year as western sales manager at the Kwix-Mix Co., a Koehring subsidiary. Mr. Conway joined the company in 1941 and became general sales manager in 1948.

Linatex Corp. of America, Rockville,

SIGNS IDENTIFY!

. . . HEADQUARTERS for a GENERAL of the ARMY

AUTHORIZED AIRCO DEALER

. . . Headquarters for Welding and Cutting Apparatus

TAKE HARDFACING ALLOYS, FOR INSTANCE . . . Your authorized Airco dealer handles more than twenty types of hardfacing rods — to combat abrasion . . . impact . . . heat . . . corrosion. Every type of wear problem! He can show you how one application may add 2 to 25 times longer service life to new or worn parts.

Every item is backed by AIRCO's reputation . . . and delivered promptly to your door!

Whether you want to buy . . . or simply seek information, check your Airco dealer first! Consult your classified phone directory (under Welding Equipment and Supplies) . . . look for this famous sign.

AIR REDUCTION

AUTHORIZED AIRCO DEALER

AIR REDUCTION SALES COMPANY · AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

ONE call
ONE order
ONE invoice

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

UNEQUALLED

. . . IN AGING AND WEATHERING QUALITIES

. . . users who KNOW buy only the BEST

Ask for them by name . . .

OKONITE and MANSON tapes

Investigate

THE IMPROVED McLANAHAN

Bantam Buster

SINGLE ROLL CRUSHER

WITH FABRICATED STEEL FRAME, CUT GEARS, ANTI-FRICTION ROLLER BEARINGS, SEGMENT ROLLS AND RENEWABLE CRUSHING PLATE TIPS

for Crushing

Coke, Lime, Coal, Salt, Alum and Similar Materials

For low initial cost and exceptional economy of operation, standardize on the McLanahan Bantam Buster Crusher. With its high ratio of reduction and rugged construction throughout, it produces a constantly uniform product of desired size—from ¾" up for market requirements.

In operation, the material to be crushed is fed into the hopper where high teeth on the roll crack the large lumps and low teeth break the smaller pieces to required sizes. These crushers are available in three basic sizes: 18" in diameter up to 48" wide, and 24" and 30" in diameter up to 60" wide.

The Bantam Buster can be choke fed through a hopper . . . or used in conjunction with a McLanahan Reciprocating Plate Feeder.

Write for your copy of Bulletin BB-5112 Today!

This new bulletin includes technical details, dimensional drawings and a table showing capacity-horsepower data for the various roll lengths and various size products.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

Complete Preparation...

CALLS FOR

Ashland

PERMATREAT COAL SPRAY

Modern preparation plants are installing oil treating equipment as an integral part of their cleaning and washing plants. They find PERMATREAT the most efficient and economical method of dust-proofing and freeze-proofing all grades of coal.

Applied by pressure, as illustrated in the circle above, PERMATREAT coats every particle of coal as it leaves the chutes. In this installation, oil is heated to about 175 degrees. This allows it to atomize into a fine mist, reducing the amount required for thorough dust-proofing.

Ashland PERMATREAT will not wash off or lose its effectiveness in transit, in the stockpile or in user's bins.

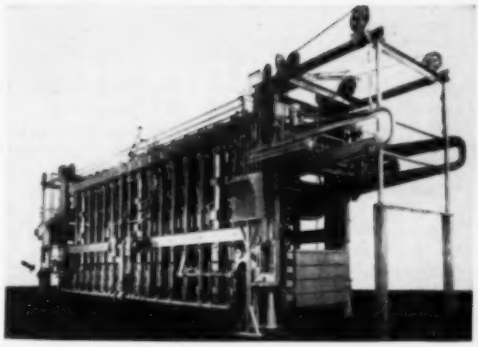
Write for complete information or ask for one of Ashland's engineers, who will help you select the correct type and installation best suited for oil treating your coals.

Ashland PERMATREAT COAL SPRAY

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

Goodyear Installs Largest Belt Press

REPORTEDLY the world's largest conveyor-belt press, this 41-ft-long unit was scheduled for installation last month in the flat-belt production line of the Goodyear Tire & Rubber Co., Akron, Ohio. More than 80-in wide, the press is capable of vulcanizing conveyor belts up to 72-in wide and weighing 20 tons. The unit uses two floor levels and necessitated revision of plant buildings before its installation.

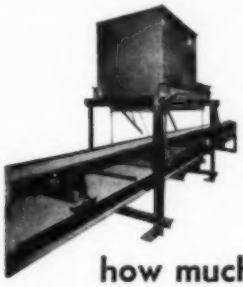


Conn., has appointed Howard Toncray II a representative in the Rocky Mountain States. For the past several years, Mr. Toncray has maintained an office in Denver, representing mining, industrial and electrical-equipment manufacturers.

Reliance Electric & Engineering Co., Cleveland, has named William C. McConnell to head its AC motor sales. Mr. McConnell was a sales engineer operating from the Detroit office for the past several years and previously was assigned to the company's Pittsburgh and Charleston, W. Va., offices. Robert B. Reed, sales engineer in Birmingham, has replaced Mr. McConnell in Detroit and in turn has been succeeded by Rex T. Willard, of the Atlanta office.

Leo J. Schulte has announced the opening of Leo J. Schulte & Co., 912 Investment Trust Bldg., Pittsburgh 22, as a distributor for a number of manufacturers of mining and industrial supplies and equipment. For the past 10 yr before opening the new firm, Mr. Schulte was associated with the Mosebach Electric & Supply Co., as purchasing agent. For the present, he intends to cover the Pennsylvania bituminous fields and expects in the near future to open a warehouse and expand his territory into Ohio and West Virginia.

F. P. Murken has been appointed manager, industrial hose division, Quaker Rubber Corp., Div. of H. K. Porter Co.,

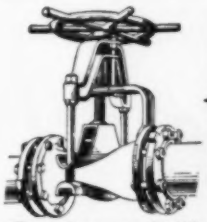


how much has the conveyor carried to NOW?

The MERRICK WEIGHTOMETER gives the answer. While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER not only keeps a continuous and accurate record of weights but total weight is available at a glance.
Applied to any size belt conveyor, either horizontal or inclined. The Weightometer gives a simplified and dependable record of your production, without interrupting flow of coal.

Write for Bulletin 851

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J.



Rubber Pinch Valves for Abrasive Pulps and Corrosive Liquids

Patented "hinged" Rubber Sleeve

Recesses molded into sides of sleeve act as "hinges" during compression, eliminating excessive strain and wear. These valves have been used successfuly for many years by various industries, wherever there is a problem of transporting abrasive or corrosive pulps or liquids. Here are some of the other proved advantages of these valves:

- Long Life Under Severe Conditions
- Unobstructed Flow Passage
- Positive Closure on Solids
- No Working Parts in Contact with Pulps or Liquids
- Only ONE Wearing Part
- Withstands All Chemicals Not Harmful to Rubber or Neoprene
- Sizes from 1" to 12" dia.
- Withstands pressures up to 150 psi.

New free CATALOG gives complete information on Massco-Grigsby Rubber Pinch Valves; Marcy grinding mills for laboratory, pilot plant and commercial grinding; laboratory crushers and pulverizers.

The Mine & Smelter Supply Co.

Box 5270, Terminal Annex, Denver, Colo., U.S.A.
Offices in Salt Lake City, El Paso, 1775 Broadway, N.Y.C.

Ever wonder why you *never* see a scowling, fagged operator on the Baker, A-C team? Here's why:

They just plain love that "doze-in-your-armchair" ease of control; that positive hold without throttle jockeying; that fraction-of-an-inch accuracy . . . that quick, direct lift; that positive down-pressure which puts almost all the tractor weight on the cutting edge; *and* the "roll-action" of the blade which leaves more tractor power for push. Because "Easy DOZE It!"

That's why you see the Baker, A-C team more and more wherever dirt has to be moved fast and efficiently. When operators *prefer* it, you can count on it being the best money-maker.

Specify Baker Bulldozers, Gradebuilders or Root Rippers for your new A-C Tractors . . . Baker makes engine-mounted hydraulic control models and cable-control models for the entire line of Allis-Chalmers crawlers. See your Baker, A-C Dealer. THE BAKER MANUFACTURING COMPANY, Springfield, Illinois.

P.S.: Baker is the PIONEER and the SPECIALIST in bulldozers

Inc., Philadelphia. Mr. Murken came to Quaker in 1944 and has been manager, wrapped hose division.

Worthington Corp., Harrison, N. J., has consolidated headquarters for the sales, engineering and production of Multi-V-Drives and Allspeed drives at its Oil City, Pa., plant in a new division to be known as the Mechanical Power Transmission Div. Sales will be under the direction of D. E. Tessendorf, manager, and H. W. Humro, assistant manager. Fred G. Moore has been named chief engineer of the division. Some 150,000 sq ft of manufacturing and warehousing floor space has been allocated to this consolidated operation, to produce products formerly made at three separate plants.

The appointments of Marcus M. Chapman as assistant general manager of sales-distribution, and James P. Barton as manager of sheet and strip sales, succeeding Mr. Chapman, have been announced by the U. S. Steel Co. Mr. Chapman joined the company in 1919 and had held various sales posts until he was promoted to manager of sheet and strip sales in 1945. Mr. Barton joined U. S. Steel in 1935 as a sales engineer in the American Sheet & Tin Plate Co. and following several promotions became assistant to Mr. Chapman in 1948.

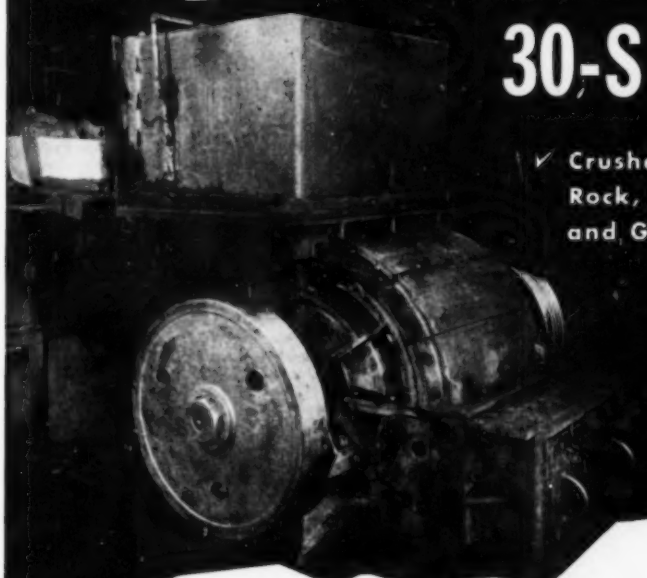
W. M. Mercer has been appointed sales manager, Morris Machine Works, Baldwinsville, N. Y. Mr. Mercer, who joined the company for 2 yr in 1936, returned to Morris Machine Works in November, 1949, as a member of the sales department. He succeeds William H. Pfarrer, who recently became head of the company's Chicago office. R. E. Jacoby, a member of the engineering department for the past 5 yr, has been named chief engineer for the company.

David Lewis has been named sales manager of the Fruehauf Trailer Co. Mr. Lewis, who will also serve as assistant to C. L. Schneider, vice president in charge of sales, was for the last 2 yr general sales manager, Lycoming-Spencer Div. of Avco Mfg. Co. E. W. Robertson has been appointed district used trailer sales manager in the Allegheny Div. for the company. Mr. Robertson has been with the sales department for 14 yr and formerly was Cincinnati branch manager.

Joseph T. Ryerson & Son, Inc., has elected James M. Mead assistant vice president. Mr. Mead managed the New York steel service plant of the company from 1946 until this year, when he was appointed first assistant to Ainslie Y. Sawyer, vice president in charge of purchasing, procurement and merchandising, with headquarters in Chicago.

John T. Tierney Jr. has been named Midwestern district sales manager for the Tar Products Div., Koppers Co., Inc. Mr. Tierney, who has been assistant manager of the district sales since June, 1949, replaces W. O. Boyd, who is retiring at his own request after 35 yr of service with Koppers.

NEW *American* HEAVY-DUTY 30-S CRUSHER



✓ Crushes ROM Coal Rock, Slate, Sulphur Balls, and Gob . . . *without oversize*

✓ Saves Labor Costs of Pickers

✓ Saves Coal

THE HEAVY-DUTY *American* PAYS OFF FOR THESE 3 MINES:

- **CRESCENT COAL CO., Central City, Ky.** "We have not spent a cent on this crusher since installation," writes the General Manager. It has eliminated two pickers . . . recovers coal previously thrown away on account of impurities. By crushing and washing, this coal is salvaged. Estimated average of 280 tons of coal and "gob" go through crusher every day. "In 18 years' experience with American Crushers, we know it is the most economical and ideal crusher for our operation."
- **PERRY COAL CO., O'Fallon, Ill.** Previous crusher required three men at the picking table, according to the Mine Superintendent. Today, only one operator is needed to remove wood and tramp metal. No replacement parts have been needed . . . recent inspection showed no signs of wear after 16 months' operation at a daily operation of 210 tons for 7" plus ROM coal. This Heavy-Duty American is one of five Americans installed at this mine.
- **SOUTHWESTERN ILLINOIS COAL CO., Percy, Ill.** "The Mine reports that the installation of the American Pulverizer #30-S crusher has been an excellent labor-saving device. In the 12 months of operation the crusher has had no parts replacements. Continued inspection and past American Crusher history indicate the maintenance of this crusher will be a very small item. Approximately 320 tons of coal per day go through this crusher."

● Let American show you how you can profit by a 30-S Heavy-Duty installation. We welcome your inquiries.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE., ST. LOUIS 10, MO.

YE GOOD KING WENCESLAUS
by YE GOOD SAINT "VIC"

Sad King Wenceslaus looked out
At the royal piping,
Faulty lines lay all about
(Those leaks and breaks were griping!)
Then he saw with much delight
What was in his stocking,
He found Couplings sure leak-tight
(Victaulics famed for locking!)

"Ah! Victaulic Fittings, too,"
Roared the King now smiling,
"Elbows, Tees all grooved and true,"
(And Full-Flow in their styling!)
Good Saint "Vic" was in the know,
Vic-Groover tools were waiting,
Kingly smiles began to grow
(Their grooving's tops in rating!)

Zip! The King hooked up those sections,
Saint "Vic" did him rightly
With these very best connections
(No leaks and drips unsightly!)
For a Method that's complete
Wenceslaus is liking
Easiest way to make ends meet
(Victaulic's Four Star Piping!)

VICTAULIC COMPANY OF AMERICA
P. O. Box 509, Elizabeth, N. J. Office & Plant: 1100 Morris Ave., Union, N. J.

Barber-Greene in New Office

BARBER-GREENE CO., of Aurora, Ill., recently completed and moved into its new office building adjacent to the main Aurora plant. Of contemporary design, with the latest of efficient, functional furnishings and equipment, the building is 250 ft long and although appearing as only two stories, actually has three floors with almost 55,000 sq ft of office space for more than 400 employees. The building is completely air-conditioned.

Truckstell Mfg. Co., Cleveland, has appointed three regional sales managers, as follows: Raymond L. Page, West Coast; C. F. Weeks, Midwest; and James M. Brown, East Coast.

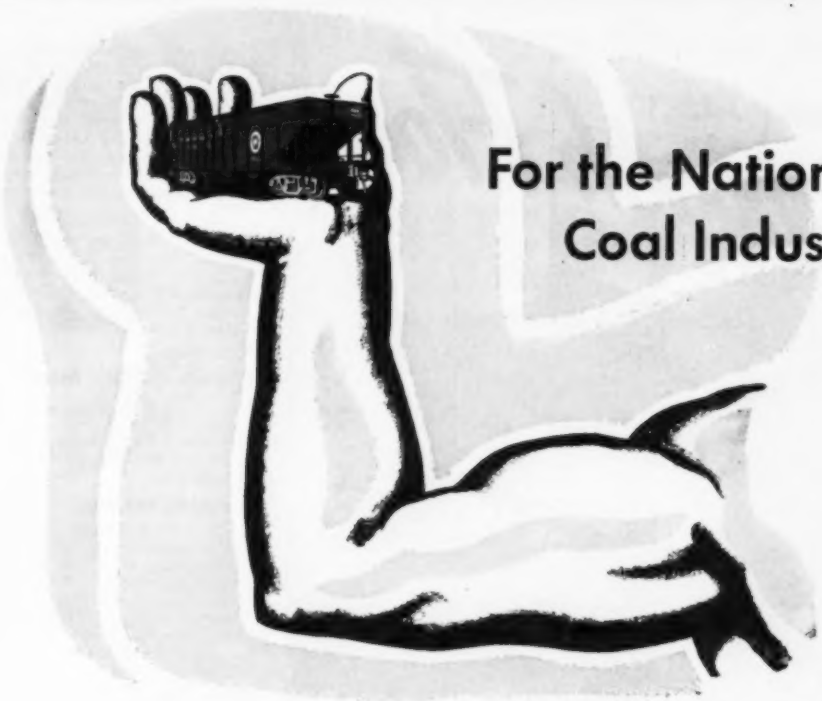
Oliver United Filters, Inc., New York, Chicago and Oakland, has appointed Dwight Richards director of engineering, as a part of its program of expansion and product diversification.

Henry K. Martin has been named manager of the mining and milling machinery division, Lake Shore Engineering Co., Iron Mountain, Mich. For the last 10 yr Mr. Martin has been associated with Oglebay, Norton & Co.

Caterpillar Tractor Co., Peoria, Ill., has announced the execution of a long-term lease for a 300,000-sq ft warehouse and parts processing plant to be erected on land immediately adjacent to its new plant site at York, Pa. Caterpillar's 600,000-sq ft manufacturing plant, under construction on a 200-acre tract, is scheduled to start into limited production about July, 1953, and to be completed by the end of that year.

Armco Steel Corp., Middletown, Ohio, has announced creation of a new coal and stone products sales department to distribute coal, coke, coal chemicals and stone products. George C. Brecht, formerly manager of Armco's by-product sales, will head the new department and will be assisted by Howard Holtzclaw, formerly sales manager of the Colcord Coal Sales Co., which will continue to operate through the new department.

Tool Steel Gear & Pinion Co., Elmwood Place, Ohio, held Open House Nov. 1 for employees, families and friends to mark completion of its new



For the Nation's Coal Industry—

A Strong Right Arm

Rail transport facilities today, as exemplified by the Pennsylvania Railroad, are a far cry from the wagons and barges which first brought coal to American markets. Coal production itself has seen a few changes, too, since the day when POWER was synonymous with WOOD . . . or a WATER WHEEL.

The coal and rail industries developed together. For more than a hundred years, they've provided the one-two punch needed to give our national economy the impetus it *had* to have for vigorous peacetime growth and vital defensive strength.

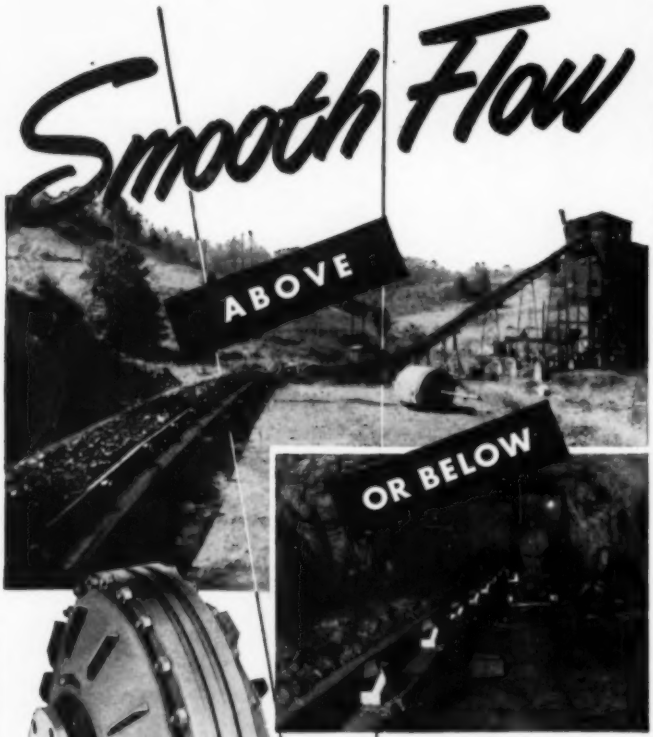
Performance is always proof of ability. Along the lines of the Pennsylvania, coal is mined for every kind of industrial and domestic need. And to market that coal, PRR operates the largest fleet of coal cars in America! Future needs of coal producers along our lines will be met efficiently, as will those of their customers in home and industry, by the link of steel rails which joins them. That is a pledge to count on.

6 REASONS WHY COAL IS THE BEST DOMESTIC FUEL

YOU mine and prepare plenty of coal which provides *HEALTHY* . . . *SAFE* . . . *STEADY* . . . *CLEAN* . . . *ECONOMICAL* heat. WE deliver it in *DEPENDABLE SUPPLY* to the coal yards... an unbeatable combination for customer satisfaction!

Pennsylvania Railroad

Smooth Flow



For above-ground or under-ground belt installations, Goodman Manufacturing Company uses Twin Disc's 12.2" Hydraulic Coupling between A. C. Motor and speed reducer on its type 97HC30 Belt Conveyors. Couplings are available for electric motors and engines developing from ¾ to 700 hp.

Whether your belt conveyor carries coal above or below ground, the ideal preventive of motor-wrecking power surges and shock loads is Twin Disc's famous shock absorbing double circuit HYDRAULIC COUPLING.

Leading conveyor manufacturers today equip their coal-flow devices with this power smoother. They have proved that the Hydraulic Coupling piles up savings by reducing peak current loads, preventing motor burnouts, protecting drives from shocks.

For information, ask for Bulletin 144-B, or call your nearest Twin Disc Hydraulic Coupling dealer.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin · HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · NEW ORLEANS · SEATTLE · TULSA

Plant No. 2 near Sharonville, Ohio. Increased facilities at both plants were expected to increase production by 30% under a $1,500,000 expansion program that is the largest in the company's 43-yr history, according to LeRoy R. Brooks, president. The new 30,000-sq ft plant houses gear-cutting equipment principally, with some special heat-treating facilities.

Harlowe Hardinge, president, Hardinge Co., Inc., York, Pa., was re-elected a director of the Pennsylvania State Chamber of Commerce for his third consecutive 2-yr term at the organization's annual meeting in October.

Illinois in 60th Meet

Begins on p 134

Maximum breaking strength was 5,825 lb per inch of width, compared to 5,970 lb when new.

MACHINE MINING

"Mechanized Mining Trends in the Coal Industry," a paper prepared for the 1952 meeting of the Rocky Mountain Coal Mining Institute (*Coal Age*, July, 1952), was presented by George C. Lindsay, editor, *Mechanization*. Reviewing the history of mechanized mining, Mr. Lindsay pointed out that there will be much heavier reliance on coal in the future. If energy demand should double, production could well reach 1 billion tons sometime between 1975 and 2000. Meanwhile coal must live, develop and prepare for the future, and failure to solve its problems could lead to nationalization and a sharp break in the economy. Mechanization at an accelerated rate is required to meet these problems, not only of today but of the future. If the problems are met, future machines should provide 75 to 100 tons per ship per man on the payroll.

MODERN PREPARATION

Factors in the design of the Orient No. 3 preparation plant of the Chicago, Wilmington & Franklin Coal Co., Waltonville, Ill., were emphasized by John A. Garcia, Allen & Garcia Co., Chicago, in opening the afternoon session, with Earl Snarr, C. W. & F. general superintendent, presiding.

"One of the largest in the world," the new plant includes wet and dry cleaning with prior removal of the extreme fines. Major units consist of a portal house with dust collectors for preliminary screening, thus minimizing the dust problem; a storage section with a capacity of 3,100 tons, equivalent of 2½ hr of running time; and a cleaning system including both wet and dry equipment.

Ultimate capacity is 1,200 tons per hour of 6 x 0 coal, with the feed split into 6 x 7/16 for washing in Jeffrey equipment and 7/16 x 0 for dry cleaning in Super Airflow units. The 7/16 by 10-mesh is cleaned and then aspirated to remove minus 48. With the 10 x 48, aspiration is done first.

A major goal in design was making

NOW! Apply up to 50 Tons Pressure ... Push, Pull or Lift

OTC

POWER-TWIN
HYDRAULIC PULLERS

A 50 Ton POWER TWIN Ram now available to handle jobs too heavy for the already famous 17½ to 30 ton units. Use this new tool to speed easy jobs, do the tough ones quicker. Ask now for full information.

WITH THE CENTER HOLE

Ask for Your FREE Copies of "AFBDA Bearing Maintenance Report"

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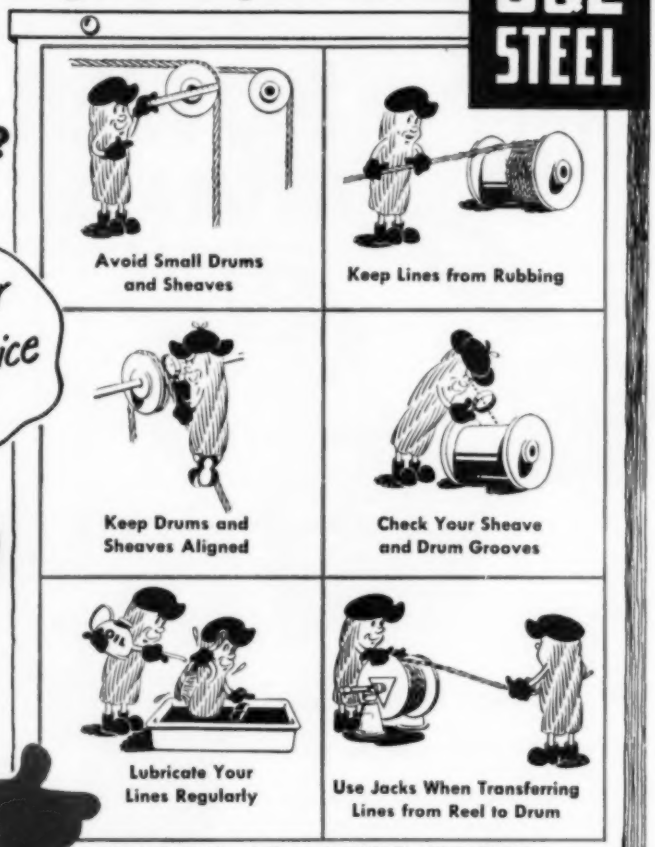
Divisions of BEARING SPECIALISTS, INC.

Shovel and Dragline Operators

do you want to cut operating costs?

J&L STEEL



SPECIFY J&L WIRE ROPES FOR YOUR EQUIPMENT

Proof of the value of any wire rope lies in its performance on the job. The unexcelled performance record of J&L Wire Ropes can be traced to J&L's *quality control* method of manufacture. *Quality control* that ensures the finest finished product by regulating every step in the manufacture of wire rope from the mining of iron ore to final stranding and closing operations. The result is wire rope that provides maximum service life—helps keep your operating costs to a minimum by cutting down time for re-rigging and making possible maximum production per wire rope dollar.

If you're not already using J&L wire rope, why not contact your nearest J&L representative *today*.

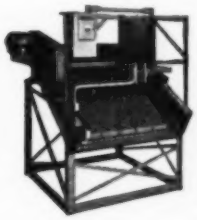
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Where Efficiency Is Important You'll Find SuperDuty Coal-Washing Tables

The SuperDuty Coal Washing Table is easily the most efficient coal cleaning device available today for the cleaning of fine coal sizes.

Although it is most widely used for the cleaning of new coal feed, its efficiency is such that many operators have found it profitable to use the SuperDuty for the recovery of coal in processing culm banks, river deposits and waste piles.

For full information about this modern money-maker, send for Bulletin 119.



FOR SCREENING ECONOMY

For special problems of dry screening of damp materials at meshes unusually finer than previously employed, the Leahy Screen equipped with FlexElex is recommended. The electrically heated screen cloth of this equipment offers fast, efficient screening at acceptable operating costs.

THE DEISTER ★ CONCENTRATOR COMPANY
103 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
COVERCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

any size—raw or cleaned—desired by the market—and making the changes while the plant is running. Standard types of equipment were installed because they were known to management and men, thus easing maintenance and operation. Space was provided for spare units for making special coals in the future. A heat drier for 7/16 by 10 mesh can be installed and another can be placed back of the 6 x 1 clean-coal crusher, if desired.

Middlings run back to the washer, Mr. Garcia noted, provide a heavy medium, and C. W. & F. management developed a combination head tank and classifier which acts like a cyclone separator in addition to providing a stable head for the washing equipment. Overall, "if the sales department can sell the tonnage, the plant can manufacture anything asked for by the customer."

Commenting, Mr. Snarr pointed out that all the coal is produced by continuous mining and everything is reduced to 6 in in the mine, providing a different operating and design problem in view of approximately 50% fine coal in the feed.

HAULING MEN

How modern mantrip cars are made and what they provide in safety and other advantages was the theme of a discussion by Evan G. Adams, general superintendent, Piney Fork No. 1 mine, Piney Fork, Ohio. Present mantrip cars, built by Watt, seat 32 men comfortably with tool and supply compartments at each end. They are enclosed on the ends, one side and the top, with the top insulated.

Why, he asked, should special cars be provided with good roof support and good haulage? One reason is that using mine cars results in losing at least one coal trip per shift, aside from enhancing delays in the sections and in the preparation plant. Another is the smaller number of men that can be handled in mine cars. With all things taken into consideration, "it becomes obvious that if we provide enough open cars to transport our men, it would require three times as many." Finally, the effect on the men is important. "We believe that any reasonable actions the management takes for the comfort, health and safety of its people are well repaid in goodwill and productivity."

AUGER MINING

The coal auger, said Robert W. Guthrie, assistant district manager, Cardox Corp., Benton, Ill., "will never replace, and certainly makes no claims in replacing, conventional methods of mining coal. It depends on stripping for development. With no further development, an auger miner, manned by an operator and his helper (two men) can mine this otherwise unprofitable coal at a rate of 150 tons per 7-hr shift, 21½ tons per hour, 71½ tons per man-shift or more."

Describing auger design and application, Mr. Guthrie noted that problems on controlling auger direction have been eliminated. "Although we do not neces-

Track to Trackless Economy for LESS...

"Trackless Mining" with conventional cutters, loaders and shuttle cars is recognized by operators throughout the United States as the most economical and efficient mining system that has yet been completely developed for present day coal mining operations.

CONVERTED GOODMAN 460 OR 360 LOADER

CONVERTED LOADING MACHINES

"Lee-Norse Conversions" thoroughly tested and proved during the past decade offer you the opportunity to go "Trackless" now by converting your present track cutters and loaders at much less cost than investing in new mining machines.

CONVERTED GOODMAN 324 CUTTER

CONVERTED JEFFREY 29U CUTTER

CONVERTED CUTTING MACHINES

Before you buy new machines, investigate the advantages "Lee-Norse Conversions" offer you, namely:

1. Lower investment compared with new mining machines.
2. Very little increase in spare parts inventory.
3. Converted machines well known to your operators and maintenance men. No need for re-education.
4. No time lost during change-over. Conversions take less than 30 days.
5. Obsolescence losses due to possible new continuous miner development held to a minimum.

It's Smart to Convert

Lee-Norse Company

CHARLEROI, PA.

sarily recommend holes as deep as 150 ft for maximum efficiency in production, the accuracy of the system is proved by the fact that in the Illinois No. 5 seam we are getting a good percentage of 150-ft holes 39 in in diameter in a seam 50 to 54 in high." Size yield is estimated at 60 to 70% plus 3-in lump and about 40% plus 6-in lump.

"There is no method of mining known to me," Mr. Guthrie concluded, "which can be entered into with as small outlay of capital, and I refer to initial and operating capital, when such outlay is considered on a per-ton basis. I know of no piece of equipment in the mining industry which can yield as great a return on the original investment.

"I have seen no mining operation which approaches the safety conditions enjoyed in auger mining. I know of no other coal-mining method which can be entered into with less experience and coal-mining know-how.

"Few operations with which I have been connected can boast of 50 tons or more per man-shift. I know of no method besides auger mining where coal can be produced without some nonproductive development work. As far as I know there exists no other mining method which has been simplified to the extent that one operation produces coal."

Preparation Facilities

Maumee Collieries Co., No. 27 mine, Linton, Ind.—Contract closed with Robert Holmes & Bros., Inc., for three Baughman Verti-Vane thermal coal drier units; total wet feed of 175 tph of 1½-in x 28-M washed coal from dewatering screens; surface moisture of coal to be reduced to approximately 2%.

Westmoreland Coal Co., Hampton Mine, Boone County, W. Va.—Contract closed with Robert Holmes & Bros., Inc., for two Baughman Verti-Vane thermal coal drier units; total wet feed of 100 tph of ¼ x 0 R-O-M coal from sizing screens; surface moisture of coal to be reduced to approximately 3%.

Oglebay, Norton & Co., Saginaw Dock & Terminal Co., St. Clairsville, Ohio—Contract closed with Robert Holmes & Bros., Inc., for one Baughman Verti-Vane thermal coal drier unit; total wet feed of 70 tph of ½x0 R-O-M coal from sizing screens; surface moisture of coal to be reduced to approximately 3%.

John E. Schumacher & Son, Pottsville, Pa.—Shipment by Deister Concentrator Co. of three SuperDuty Diagonal-Deck No. 7 coal washing tables for cleaning Nos. 2, 3 and 5 buck.

National Coal Meets . . .

Begins on p 132

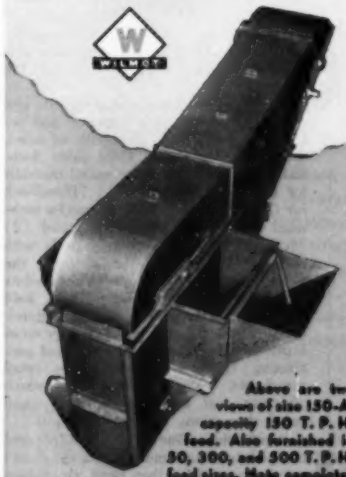
ing Committee has developed a third kind of agreement with retailers. The new contract, called the Association Agreement, enables NCA to make an agreement with an established retail asso-

New

WILMOT-DANIELS HEAVY-DENSITY UNIT

FEATURES

Remarkable Simplicity



Above are two views of size 150-A; capacity 150 T. P. H. feed. Also furnished in 50, 300, and 500 T. P. H. feed sizes. Note complete-in-1-unit construction.

In addition to eliminating such common heavy-media problems as fluctuation of bath density and loss of product to refuse, the new Wilmot-Daniels Heavy Density System also introduces radical advances in simplicity. For instance: this system requires no densifier; no thickener, no thickener tank, no thickener pump; and magnetizing blocks are eliminated. In addition to these 5 major parts, 4 less motors are required. Refuse is moved by a simple drag-line conveyor. As a result of this compactness, the Wilmot-Daniels Heavy Density System requires about 20% less floor space than other heavy-media systems. To further lower the cost of installing this system, it is custom-designed to fit your floor space. This can effect substantial savings over "package units". Let us send you complete technical details of how this new system operates and cuts costs for metal and coal producers.

Send for **BULLETIN 521**

WILMOT ENGINEERING CO.

HAZLETON, PA.
Plant: WHITE HAVEN, PA.

HEAVY DENSITY DIVISION

ciation and does not require organization of a separate CHS group. Mr. Griffith stated that in the past year CHS retailer groups had paid $200,666 into producer-retailer projects; NCA, $195,760.

"At long last we are recognizing the fact that every segment of the coal camp has chips in the same game."

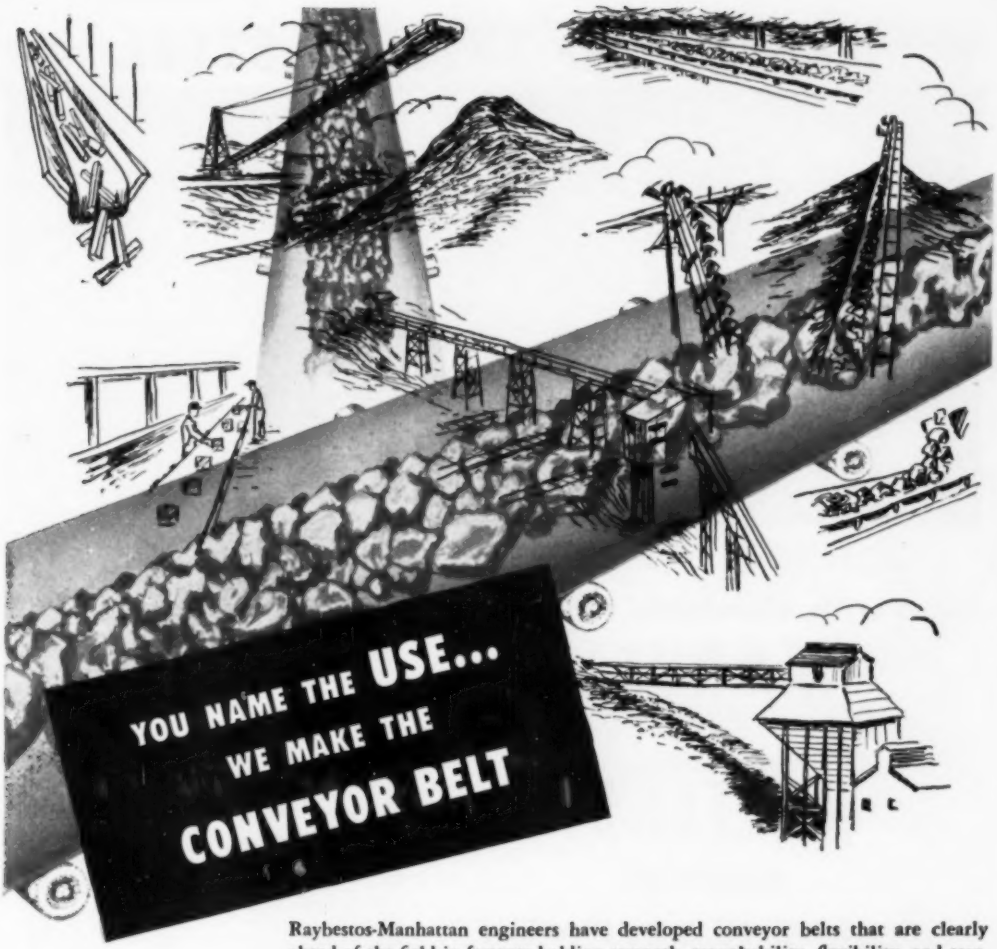
"Production is important but the business graveyard is filled with the wreckage of firms that knew how to mine or manufacture a product but didn't have sufficiently able marketing manpower to move it," said Dr. Brown. His plea was for dynamic salesmen in the industry, made effective and efficient by proper selection, careful training and intelligent supervision. The task of developing salesmen is top management's, Dr. Brown said. He outlined a salesman-development program as follows:

1. Selection—First set up a preliminary screening interview to eliminate obviously unfit men. Provide survivors with a searching questionnaire and give them an hour-long "depth" interview when they return the filled-out questionnaire. The depth interview should follow a prepared guide that leaves little to the imagination. References of candidates who survive the long interview should be investigated carefully. Aptitude and ability tests are the next steps in selection. Final decision is made by top management on the basis of all that has been learned about the candidates.

2. Training—Pre-job training should be carefully planned and formalized. It should cover coal characteristics, production, preparation and utilization. It also should include office methods, salesmanship principles and the selling points of competing fuels. Pre-job training probably will stretch from a few months to a year, depending on the size of the company.

On-the-job training is endless. Its aim should be to sharpen, improve and refresh the knowledge and skills of salesmen. The American Coal Sales Association has developed two useful manuals for on-the-job training: (1) *"Handbook for Coal Salesmen,"* which provides technical information about coal; and (2) *"Selling Techniques,"* which deals with actual salesmanship. In addition, the association stages sales clinics to up-date and spur salesmen. These clinics, held mostly in big cities with average attendance of 150 men, include talks by combustion engineers, addressed by coal purchasing agents and progressive retail merchants, reviews of market research affecting coal and coal salesmen, and panel discussions of sales problems.

Supervision—One of the most frequent complaints of salesmen is that they can't get the supervision they need, Dr. Brown revealed. Steps that will help the salesman who complains of inadequate supervision are: (1) informing the salesman about how he is evaluated and where he stands; (2) making the salesman answerable to only one supervisor; (3) keeping reports at a minimum while clarifying the need for the information asked for; and (4) giving the salesman

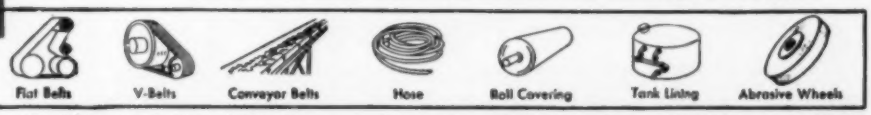


Raybestos-Manhattan engineers have developed conveyor belts that are clearly ahead of the field in fastener-holding strength, troughability, flexibility, and tear-resistance . . . belts specially cushioned for heavy duty shock loading. Heavier construction for long lifts, high tensions, grueling loads . . . lighter constructions for factory materials handling, package conveyors and food belts . . . are all in a day's work at Raybestos-Manhattan • Conveyor Belts may not be your problem today, but whenever you think of transmission, conveyor, V-belts or hose . . . or *any* industrial rubber product — remember "Raybestos-Manhattan makes it". Consult your R/M representative.

R/M

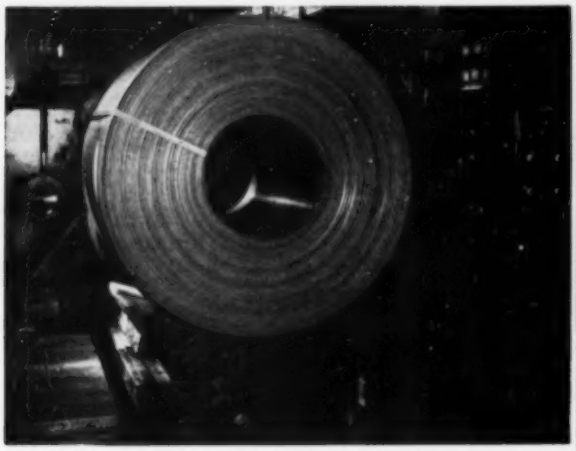
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

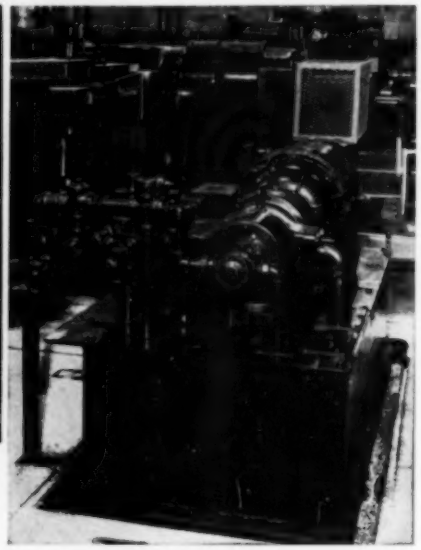


Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

At UNITED STATES STEEL



Coil cradle on United States Steel Company's Irvin Works Three-Stand Cold Reduction Mill. Marvel Synclinal Filters are a par of the mill's main hydraulic system which operates this cradle as well as other hydraulic machines.



Hydraulic pump and tank on the reeler hydraulic system of United States Steel Company's Gary Sheet and Tin Mill's Continuous Galvanizing Line. A Marvel Synclinal Filter is installed inside the tank on the suction line.

and with Hundreds of Others

MARVEL SYNCLINAL FILTERS

PROTECT HYDRAULIC EQUIPMENT

IN 1951 ALONE OVER 30,000 MARVEL SYNCLINAL FILTERS have been specified for installation on all types of hydraulic and oil recirculating equipment. In the plants of America's industrial giants as well as in the plants of smaller businesses, Marvel Synclinal Filters are doing a job protecting machines and increasing production. They are proving their superiority in the one real test — on the job. Records show Marvel Synclinal Filters operating longer between cleanings, requiring less attention, cutting down time, and in short, achieving more production with less maintenance. Not only plant operators, but also over 300 manufacturers of machines have recognized the superiority of Marvel Synclinal Filters, and now install them as original equipment.

★ **WATER FILTERS** In response to the great demand, we have adapted both our sump and line types for use in all water filtering applications. No changes have been made in the basic synclinal design.

SUMP TYPE (Cutaway) LINE TYPE (Cutaway)

A SIZE FOR EVERY NEED in filtering non-corrosive liquids in hydraulic and low pressure systems. Sump and line type models available in capacities from 5 to 100 g.p.m. and in mesh sizes from 30 to 200. All models may be quickly disassembled, cleaned and reassembled on the spot by any workman. Line types operate in any position and are easily serviced without disturbing pipe connections.

Write for Complete Engineering Data—Specify Oil or Water

Meets J. I. C. Standards

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

proof that the report is being studied and that the information is useful to him and the company.

"Twenty-eight of BCR's projects have produced results now in use and 22 need active promotion by the industry."

"Bituminous Coal Research, Inc., is an important factor in vitalizing the bituminous industry, is an effective source of technical information about coal and is helpful in increasing customer satisfaction with your product," Dr. Potter said. He listed BCR accomplishments as follows:

1. **Development** of new and better equipment for burning coal in homes and for controlling smoke and dust in industrial installations. The industry, however, has failed to promote these developments adequately in the market.
2. **Establishment** of uses for coal on farms, especially for crop drying. This project also needs active promotion by the industry.
3. **Development** of equipment for burning powdered coal in a gas turbine.
4. **Design and construction** of continuous mining equipment.
5. **Discovery** of new basic facts about chemicals from coal.
6. **Clarification** of the technical and economic factors affecting coal gasification and headway in developing an improved gas producer.
7. **Improvement** of coal's competitive advantage as a fuel for small industrial plants.

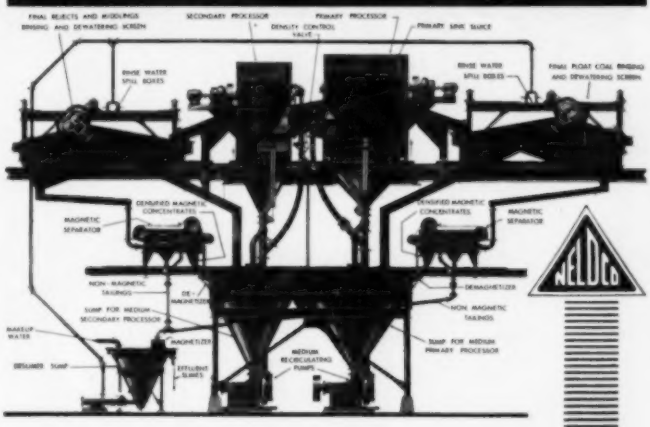
These accomplishments have been marked up by expenditure of less than 0.02% of the gross revenue received by coal producers and coal revenue of railroads since BCR was established, Dr. Potter said. He explained that this is far less than expenditures of other industries of similar size. Citing action of the last annual meeting of BCR approving an enlarged Plan of Action and stressing the need for promoting the results of research and development, Dr. Potter said, "It is up to those who endorsed the Plan of Action to provide the means for carrying it out."

"The competition of oil and gas should become less and coal then will be the dominating factor in the thermal generation of electric power."

Coal consumption by electric utilities, which reached 105,000,000 tons in 1951, may increase to over 150,000,000 tons by 1956, Mr. Cisler said. But he warned that if the price of coal continues to rise, oil and gas will keep on being strong competitors. In 1935, for every dollar of revenue, Detroit Edison spent 10.9¢ for coal. By 1950, that figure had risen to 20.9¢. Interrupted supplies, arising out of strikes, also are unfavorable to coal. Mr. Cisler explained that the expectation of strikes has forced the company to carry 200,000 tons more in stockpiles than it used to carry. This addition to stockpiles ties up an investment of $2,000,000 on which taxes **must** be paid.

Rising coal costs and frequent strikes

TWO-STAGE COAL CLEANING



The NELDCO Two-Stage Dense Media Processor efficiently produces a clean float product at any desired level of specific gravity down to 1.35 specific gravity and a reject upward of 1.60 to 2.00 specific gravity. The intermediate product lying between the density of the two vessel baths, is therefore isolated and may be crushed for the purpose of releasing laminated impurities, and salable fuel which can be subsequently recovered by recycling the crushed middlings with the raw coal feed through the plant.

The result is the scientific achievement of increased yield and complete control over the quality of both float coal and sink rejects products, with considerable saving of investment cost, operating labor, space and power requirements.

Available in capacities 75—325 tons per hour.

Send for Folder No. 152 which describes the operation of the Two-Stage Processor and also gives dimensions and capacities.

We also design and build custom-built coal cleaning plants in any size—any capacity, either single or two stage separations.

Standardized Packaged Coal Cleaning Plants are available for single stage cleaning in six sizes—capacities 50 to 325 tons per hour. Send for Book No. 151.

NELSON L. DAVIS COMPANY

DESIGNERS AND BUILDERS OF COAL CLEANING PLANTS USING THE DENSE MEDIA PROCESS

343 SO. DEARBORN ST., • CHICAGO 4, ILLINOIS

FOR *Safest* INSTALLATION OF ROOF BOLTS

ALWAYS USE DEPENDABLE

DUFF-NORTON

Mine Roof

JACKS

Don't take chances! Be assured of maximum safety with Duff-Norton mine roof jacks as temporary supports, when installing split rods, expansion bolts and all other type suspension supports in your mine. For complete data on mine roof and other Duff-Norton Mine Jacks . . .

See your local distributor or write for the "Handy Guide for Selecting Duff-Norton Mine Jacks."

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

have spurred Detroit Edison's interest in generating power from nuclear fission, Mr. Cisler said. Another spur to this interest is the fear that if private industry fails to develop atom-generated power, the government will take over. Four groups comprising electric utilities and other industries already have reported that it is feasible to make electricity from atomic energy, though they do not agree in the details of plant design or cost. Detroit Edison is a member of one of these groups.

Giving some details on the cost of power from the atom, Mr. Cisler compared estimated costs of his company's new St. Clair steam station, with 625,000 kw capacity, with the investment that could be justified in a similar plant generating electric power from nuclear fission. Total cost of the St. Clair plant will be about $98,700,000; cost per kilowatt of capacity, $158. Taking into account negligible fuel and labor costs, the company could justify an investment of $141,713,000, or $227 per kilowatt, in a nuclear-fission plant. Every increase of 50¢ per ton in the price of coal would add $10 per kilowatt to the justifiable investment in a nuclear-fission plant, he said.

Even so, Mr. Cisler concluded, coal is "still the outstanding energy source which can be relied on today and unquestionably it should occupy a major role in the economy of this country for the foreseeable future."

Open forum discussion following the close of the day's formal program included the following:

R. E. Salvati, president, Island Creek Coal Co., asked for more substantial support for BCR's program and urged wider promotion of the products of research.

Lewis Stein, president, Elliott Coal Co., warned of the danger that the government might take over development of electric power from nuclear fission if private power companies failed to act and raised the question of a fair price for coal sold to utilities. Mr. Griswold replied that most utilities are eager to keep the government out of private business.

Julian E. Tobey, president, Appalachian Coals, Inc., asked how much coal will be required to make fissionable materials for use in power plants. Mr. Griswold pointed out that great quantities of electric power now are needed for the gaseous-diffusion process but that less power may be needed when other processes, notably "breeder reactors," are fully developed.

"The responsibility of operating this great industry must rest on trained men. It is our responsibility to make available such men."

Stressing the need for education at this time, when coal is on the threshold of great achievements, Henry C. Woods, chairman of the board, Sahara Coal Co., estimated that by the end of 1953 there will be a shortage of 50,000 engineers in the United States. Mr. Woods, chairman of NCA's Vocational Training & Education Committee, was the first

Another mine goes PAYLOADER

— LOADS TRUCKS FASTER
—AVOIDS COAL BREAKAGE
— IS BEST FOR CLEANING OFF COAL
— MAINTAINS ROADS
— PUSHES, PULLS, LIFTS

• The evidence in favor of "PAYLOADERS" keeps pouring in from coal mines, both strip and underground — proof of profitable performance at many tasks, and here's one from Walter Beisser, President of Ten-X Coal Co., who says his 4-wheel drive Model HM has proved much more satisfactory than other equipment in many ways. It loads trucks faster from stockpiles, loads high trucks better and does not break the coal in the process.

He further states that *this powerful 1½ cu. yd. tractor-shovel is the best equipment he has ever had for cleaning off the coal at the strip mine — and he's tried dozers, graders and other equipment.* Additional valuable "PAYLOADER" uses at Ten-X are road maintenance, moving tools and supplies, pushing, towing and lifting.

You'll find plenty of ways to keep a Model HM profitably busy at *your* mine too, and your "PAYLOADER" Distributor is ready to give you all the facts. See him today or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.

Free CATALOGS are yours for the writing, on any size "PAYLOADER": — 4 wheel drive Models HM (1½ yd.) or HR (1 yd.); Rear wheel drive HY (1¼ yd.), HF (¾ yd.) or HE (½ yd.); Front wheel drive HAM (15 cu. ft.) or HA (12 cu. ft.).

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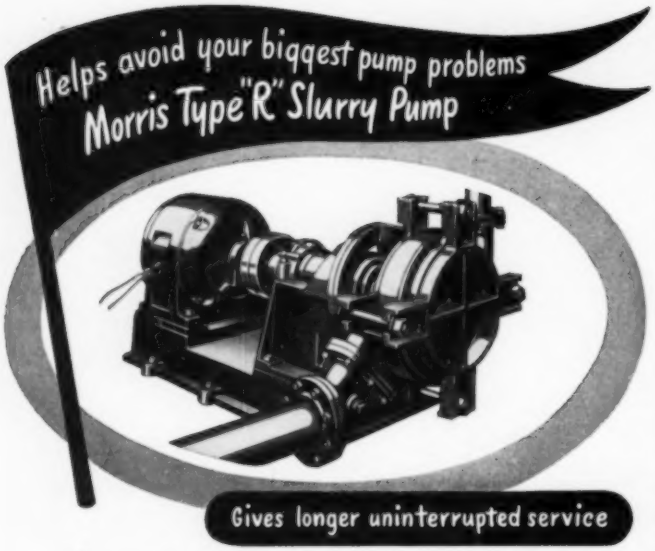
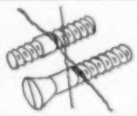
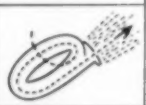


Ordinarily harsh abrasives wear out your pump. The corrosive action of acids eats away its utility. Time-consuming maintenance and repairs cut down your production. Now see why the Morris Type "R" helps avoid these problems.

1		**Simple design—The Morris Type "R" has no internal studs and bolts. Nor does it have troublesome internal joints and fits. The Suction Disc Liner is merely clamped into position between disc and shell.** ***Fewer wearing parts means less maintenance and longer uninterrupted service.***
2		**Easily dismantled—The impeller and shaft sleeve of the Morris Type "R" Slurry Pump can be renewed without disturbing the suction and discharge piping or the bearings. This means considerably less lay-up time.**
3		**More abrasive resistant—With the clamping effect of the bolts on the discs, the shell is not subject to high stress. Consequently, the shell can be made of a large variety of materials, including those of high abrasive resistance. Yet these materials need not necessarily be of high tensile strength.**
4		**The hydraulic passages of the suction disc are extremely large and velocities are low. As a result, wear is minimized and renewal infrequent.**
5	~~FREQUENT PACKING + SHAFT SLEEVE RENEWAL~~	**Stuffing box troubles are practically eliminated because the suction gland is under low suction pressure only.**

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speaker at the Wednesday morning session, with W. D. Hamilton, coal mines manager, The Saginaw Dock & Terminal Co., presiding. Other speakers at the session were: H. B. McClure, vice president, Carbide & Carbon Chemicals Co.; John S. Routh, president, Coal Exporters' Association of the United States, and president, Routh Coal Corp.; and Robert E. Lee Hall, NCA counsel.

There will be a greater shortage of coal-mining engineers than of any other kind because young men are not being attracted to coal, Mr. Woods said. To excite young men about coal and draw them into the industry, each coal company must work in its own area. Mr. Woods suggested the following steps:

1. Visit high schools and talk with principals and teachers with the aim of encouraging young men to take high-school courses that will lead them to embrace coal-mining engineering when they go to college.

2. Offer summer employment to college students and assure them of permanent employment when they are graduated.

3. Establish scholarships in universities offering mining engineering and set up loan funds as well.

4. Keep in touch with the Vocational Training & Education Committee.

Mr. Woods reported that his committee is continuing its visits to campuses where mining engineering is offered. Plans for the year ahead include visits to the University of Kentucky, the University of Alabama and Lehigh University. Plans also include establishment of a 2-wk course in fuel combustion, the course to be prepared and taught by faculty members at Pennsylvania State College following commencement in June, 1953. Co-sponsor of this course will be the American Coal Association. Cost of attending the session should not exceed $250 per man, Mr. Woods said.

"We obtain directly from coal many chemicals normally synthesized from the simpler products of coke-oven operations."

Carbide & Carbon Chemical Co.'s coal-hydrogenation chemical plant at Institute, W. Va., is the first and only such plant built to date for making chemicals rather than liquid fuels from coal, Mr. McClure stated. Also, he added, it is the only such plant built entirely with private funds. Though the process used in this new plant bears a superficial resemblance to earlier Bergius-process plants, the company has made many improvements in technique and operations (*Coal Age*, October, 1952, p 70).

Turning from process to markets, Mr. McClure pointed out that the coal-tar and light-oil industries have been growing at the rate of 2 to 3% per year, roughly paralleling growth of the steel industry. But demand, involving such chemicals as benzol, phenol and others, has been growing at the rate up to 35%. These chemicals are used for such end products as synthetic detergents, coatings and man-made fibers. Though markets have not been developed or even discovered for some chemicals that will come from coal hydrogenation, Carbide

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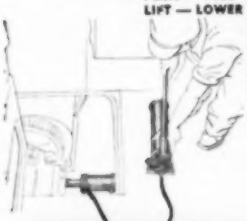

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& Carbon's experience indicates that energetic sales policies and application research usually develop faster than plants can be built to supply the demand.

The petrochemical industry now, after 33 yr of growth, produces 8,000,000 tons per year of products. Chemicals from coal may experience the same measure of growth in the years ahead, Mr. McClure intimated.

"Export of coal in 1953 will be approximately 20,000,000 tons—a very substantial movement."

Undertaking to set the record straight, Mr. Routh pointed out that only a small part of coal exports is financed by the U. S. government and that the high quality of American coals has built a lasting market in Europe that will not be lost to increasing production in European mines. Turning to the Schuman Plan for freeing trade in coal and steel among six nations of Western Europe, Mr. Routh explained that while the plan's effect on coal exported from the United States will not be clear until the plan is fully in operation, there will be a need for American coals, especially gas and coking coals, for some time to come. Most coal exported from the United States, he explained, now is being paid for with free dollars. In short, the export outlook adds up to a reasonably stable market in the years ahead.

"We are entitled to hope that future predictions will fall into a pattern of less taxes and fewer controls."

Under new Presidential leadership but with a thin margin of control favoring the Republicans, Congress must decide what to do about laws that expire in 1953 and 1954, Mr. Hall said. He listed four "musts" in taxation:

1. Excess profits tax, expiring June 30, 1953.
2. Individual income-tax increases, expiring Dec. 31, 1953.
3. Increases in corporate income taxes, expiring April 1, 1954.
4. Increases in excise taxes, expiring April 1, 1954.

Chances are that a coalition of Republicans and Southern conservatives will act conservatively on these matters, Mr. Hall predicted. Meanwhile, he warned, the industry must guard its recently-won gain in percentage depletion. NCA's Special Tax Committee has made the following recommendations, he reported:

1. **Reduction of** tax rates when revenues permit.
2. **Abolition of** excess-profits tax.
3. **Abolition of** the 2% penalty for consoildated returns.
4. **Allowance of** credit to individuals for dividends received.
5. **Shift in** the burden of proof in imposing penalties for improper accumulation of surplus from the taxpayer to the Commissioner of Internal Revenue.
6. **Adoption of** standards for inventory valuation.
7. **Adoption of** certain technical amendments to percentage-depletion allowances.

Mr. Hall pointed out that wage, price

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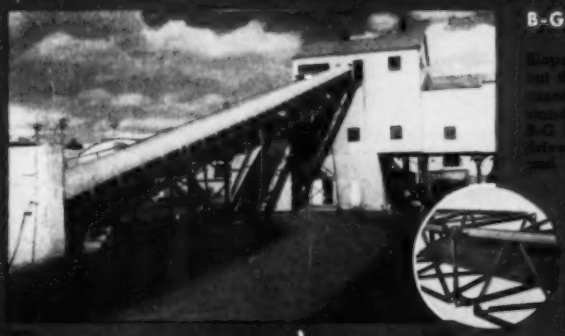

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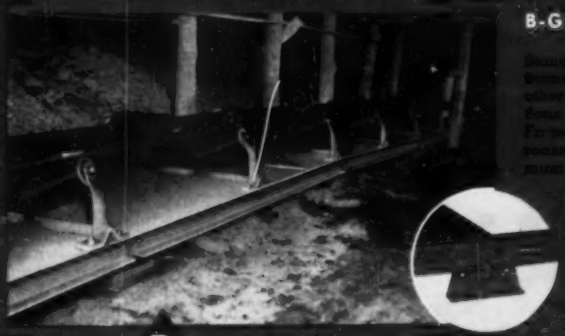

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DISTRIBUTORS IN ALL PRINCIPAL CITIES

and rent controls expire June 30, 1953. Coal, in fact, could be decontrolled now without upsetting the Nation's economy because of competition within the industry. He urged that Congress block the Wage Stabilization Board in granting productivity increases, explaining that the benefits of increased efficiency should not go wholly to labor.

"We oppose the sale of natural gas for inferior purposes."

The Fuels Research Council, Inc., is the industry's first line of defense against the encroachments of oil and gas, said F. A. Fontyn, president of the council and president, Ebensburg Coal Co. Mr. Fontyn reported for the council at the Wednesday afternoon session, with L. C. Campbell, NCA president and vice president, Eastern Gas & Fuel Associates, presiding.

The council, embracing anthracite as well as bituminous in its membership, works directly with the Federal Power Commission and deals with such matters as the adequacy and availability of oil and gas and the financial structure of companies seeking FPC certification. In 1952, Mr. Fontyn reported, the council participated in 65 applications before FPC for extensions or new pipelines, including some applications for import of gas from Mexico and Canada. The council blocked or modified decisions favoring gas in five cases and succeeded in barring dump rates for gas in other cases.

"Your NCA committees are ably directed and actively engaged in their work"—Tom Pickett, NCA executive vice president.

NCA committee chairman at the closing session Wednesday afternoon presented reports as follows:

W. H. Cooke, Coal Defense Committee—Mr. Battle, reporting for Mr. Cooke, stated that the committee has kept in close touch with government agencies throughout the year but that coal's protective machinery was put in such good condition at the outbreak of the Korean hostilities that little action has been needed since that time.

L. E. Tierney Jr., Interstate & Foreign Commerce Committee—The committee succeeded in holding freight-rate increases on coal below the general level of increases imposed on other commodities and continued its successful opposition to the St. Lawrence seaway. The committee soon will seek a freight-rate structure on flyash that will permit its sale and shipment by coal users on a sound economic basis.

L. Russell Kelce, Land Use Committee—T. C. Cheasley, assistant to the president, Sinclair Coal Co., reporting for Mr. Kelce, stressed growing cooperation with other extractive industries in the cause of land reclamation and commented on the committee's new and increasing emphasis on stream pollution.

R. E. Jamison Jr., Membership Committee—New members added since the last NCA meeting are 29 companies in 13 states representing 13,750,000 tons

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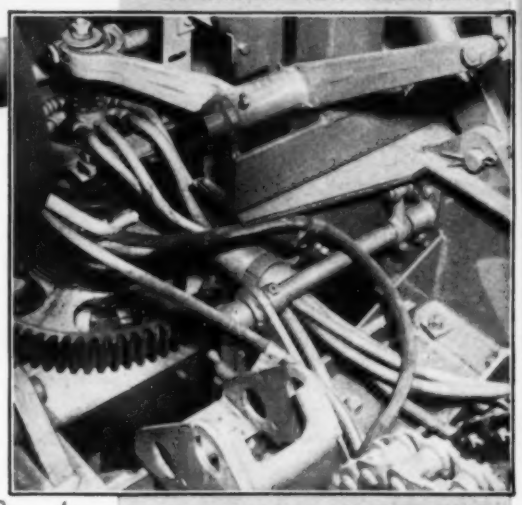

Here Aeroquip Flexible Hose Assemblies are used in the hydraulic system of a wheel-mounted shovel crane. Wire braid reinforced, these heavy-duty hose assemblies match the ruggedness of hardworking earthmoving equipment of all types.

Save time, save money and reduce inventory by putting the "Aeroquip Idea" to work for you. With Aeroquip you make your own flexible hose assemblies by cutting bulk hose to desired lengths and attaching Aeroquip Reusable Fittings. Assembly can be accomplished quickly and easily right on the job. No special tools are required. No training is needed. Aeroquip high quality Flexible Hose Lines improve performance and reduce maintenance. They eliminate leaks due to vibration and operate dependably at extremely high or low temperatures. They are widely used for hydraulic fluid, water, air, lubricating oils, gas and Diesel fuels and many other fluids.

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of annual production. The association lost 5,500,000 tons by withdrawals of all kinds.

S. A. Caperton, Safety Committee—Mr. Pickett, reporting for Mr. Caperton, pointed out that coal's fatality and nonfatal injury records for the past several years have been better than those in some other industries and that coal's accident rate has declined steadily. He urged the industry to extend its finest cooperation toward successful administration of the new federal mine-safety act and pledged that the committee would continue its program of education, research, cooperation and good relations with the public, management and employees.

Final act of the convention was adoption of a resolution providing for the collection of monthly statistics on coal distribution by state and subdivision, such statistics to be used by NCA's Marketing Committee and other agencies as an aid in merchandising and promoting coal.

Fuel Men Study Coal Use

Begins on p 138

costs somewhat lower to balance the higher initial cost. As the plant capacity is increased, however, the new units are designed to burn a mixture of 30% anthracite and 70% bituminous. On the matter of performance, Mr. Richards reported that the coal rate is 1.02 lb per kwh output and the heat rate is 11,800 Btu per kwh output. Plant capacity with three units now in service is 250,000 kw.

"Why not burn coal right in the bin?", asked Dr. Johnson, in presenting an idea for eliminating objections to anthracite as a domestic fuel. In taking this new approach to the development of solid-fuel burning equipment, Dr. Johnson pointed out that past research has been concentrated on producing smaller, cheaper units that must burn the fuel at a faster rate. But changes in home architecture and living habits bring new problems in designing heating equipment.

A foolproof burner should have no electrical or mechanical attachments, should provide for adequate fuel storage, should be as small as possible, and the cost should be reasonable, Dr. Johnson said. Burning the coal right in the bin satisfies these conditions. Anthracite Institute research shows that it can be done. In one unit, 2,600 lb of anthracite was burned at a rate of ¼ lb per hr. Efficiencies up to 95% have been achieved with egg coal in such a burner, the heat being stored in an accumulator which might consist of a shell of rock surrounding the bin. The installation could be made either inside or outside the home.

The features of the new anthracite flotation plant at Coaldale colliery, Lehigh Navigation Coal Co., Lansford, Pa., and the fundamentals of oil treatment in the preparation of coal were major topics of the Friday morning session. The paper

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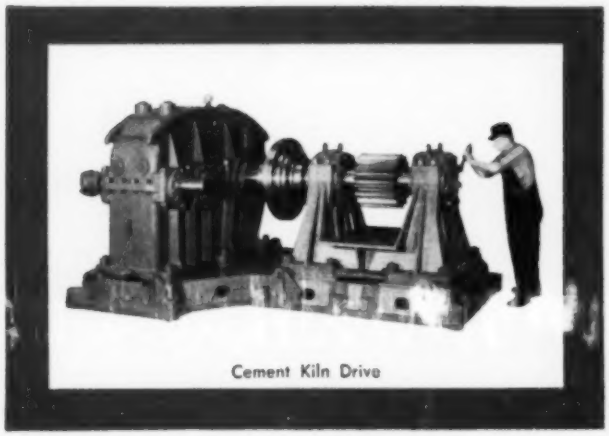
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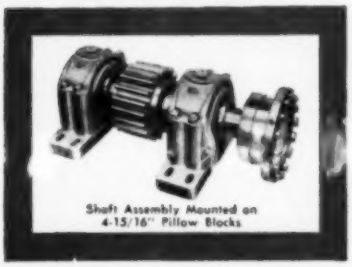
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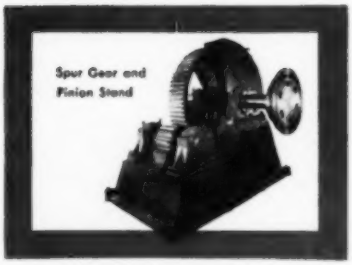
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on anthracite flotation at Coaldale was prepared by W. T. Turrall, superintendent of preparation, and M. J. Cook, preparation engineer, Lehigh Navigation Coal Co., and was presented by Mr. Turrall. Other speakers were John L. Stewart, Ashland Oil & Refining Co., Ashland, Ky., on the use of oil in coal preparation; C. E. Berry, Viking Machinery Co., Jackson, Mich., on the mechanics of oil treatment, with J. H. Dawson, Viking Machinery, as co-author; and Alfred F. Meger, preparation engineer, Hanna Coal Co., St. Clairsville, Ohio, on a new method for spraying oil at Hanna Coal's Georgetown plant. Orville R. Lyons, Republic Steel Corp., Cleveland, Ohio, and R. E. Zimmerman, U. S. Steel Co., Pittsburgh, Pa., conducted the meeting.

The new fine-coal plant at Coaldale includes two 6-ft Wilmot Hydrotators, a 16-ft Hydrotator-classifier and 12 Denver Sub-A flotation cells to recover 3/32x200-mesh fines from the breaker water. Mr. Turrall explained, in pointing out that the 6-ft units clean Buckwheat No. 4, the 16-ft machine cleans No. 5 coal and flotation coal consists of 20x200-mesh fines. Cleaning efficiencies, based upon the theoretical and actual recoveries, are 97.4% for No. 4 coal, 78.5% for No. 5 coal and 98.1% for flotation coal, with actual recovery calculated from the ash formula and theoretical recovery from float-and-sink data.

Leaning to froth flotation in preference to matte flotation, Mr. Turrall explained that froth-flotation cells require no mechanical agitation and consumption of reagents is kept to a minimum. On the other hand the top size that can be efficiently floated is about 28 mesh. A 45-ft hydroseparator classifies the flotation feed.

Among the unusual features of the plant is single-stage conditioning in the flotation section, where a classifying conditioner removes much of the coarse high-ash material and pyrites from the feed. The tank is fitted with a baffle to direct the objectionable material to the bottom of the conditioner, from where it is ejected through an airlift, Mr. Turrall explained. There is no other conditioning in Coaldale flotation. In dewatering, the flotation product is pumped to a 24-in cyclone. Overflow from this unit is pumped to a 12-in cyclone for further thickening and the underflow of the larger unit is discharged to the dewatering screen, as is the underflow of the 12-in cyclone. In addition to adjusting the coal-water ratio, this method of dewatering also eliminates much of the minus 200-mesh fines.

Though oil treatment of coal is less than 25 yr old, today about 875 preparation plants are treating some 50 million tons per yr, Mr. Stewart said, in explaining that oil is a natural coating compound for coal.

Since we are still in the process of learning how to best treat coal with oil, it would be worthwhile for preparation officials and sales personnel of producing companies to visit the yards of coal dealers to discover the condition of the prod-

MODERN MINING *demands* PROTECTED CABLES

Mine operators everywhere are turning to modern improved methods to step-up their efficiency and production. And in all cases this means greater electrification: with portable power centers, junction and distribution facilities, continuous mining machines, high capacity loading and drilling equipment, etc.

Ruberoid Insulating Tape can insure more economical operation of this equipment by providing complete protection for electrical cables. Ruberoid Insulating Tape strengthens cables with a vise-like grip so that you can drag them anywhere with complete safety . . . through acid pools and over jagged surfaces. Check these seven cost-cutting features of Ruberoid Insulating Tape to assure longer life for your cables:

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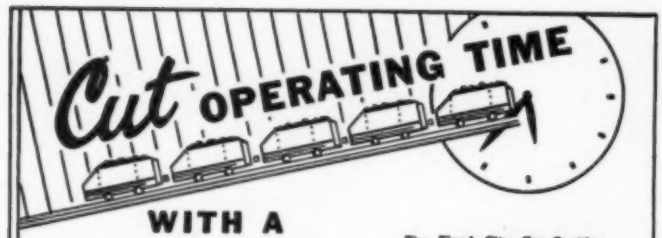

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SPECIFICATIONS: Length, 7'; Width, 28½"; Height, 30½"; Weight, 2195 lbs.; Rope Capacity, 500 ft.—⅝", 750 ft.—½". Channel iron frame with solid steel bottom . . . completely guarded . . . all parts readily accessible.

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uct at its destination, Mr. Stewart said. This would help in setting up better spraying methods at preparation plants. Concerning the benefits of oil treatment, Mr. Stewart explained that dustproofing is the prime objective but better dewatering and a measure of freeze protection also are achieved.

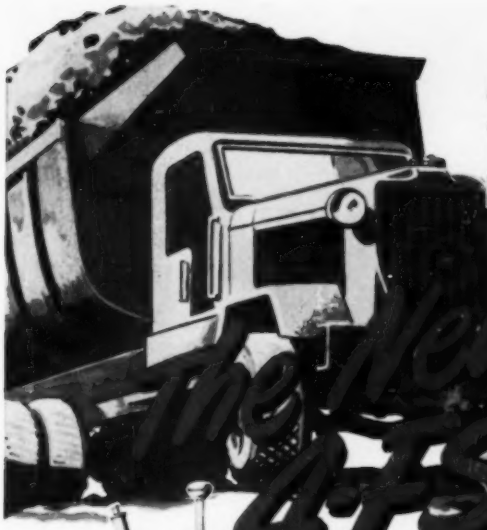
Extensive tests in dewatering high-volatile loaded coals show that oil-treated coals dewatered in one-fourth of the time required for non-treated coals to the minimum moisture content to which raw coals will dewater. Oil treatment helps to prevent freezing by promoting faster dewatering. Furthermore, treated coal is easier to handle because it does not cake, and windage losses of coal in transit are held to a minimum. Such windage losses may add up to ¼ ton per car for every 100 mi in transit.

On the mechanics of using oil in coal preparation, Mr. Berry warned that uniformity of treatment is paramount, with the process being considered as a painting job. Maintaining constant viscosity is important if uniformity of application is to be realized, and the proper use of heat or cutting agents will assist. Mr. Berry advocated the use of heaters at the central tank and throughout the oil-handling system, noting that electric heat, distributed through heating cables can be applied to piping, nozzles, tanks and at other places where thickening or thinning of the oil will cause changes in viscosity, thus preventing uniform flow.

On the selection of the proper oil, Mr. Berry pointed out that there is a minimum viscosity which must be observed if the coating is to be permanent. Oils which are too light will evaporate. Availability of oil at nearby sources is important to keep transportation charges within reason if the treatment process is to be economical. The subject of oil treatment has been extensively covered in Technical Report No. 6, prepared by Bituminous Coal Research, Inc., Mr. Berry reported.

In describing an actual oil-treatment installation at Georgetown preparation plant, Hanna Coal Co., Mr. Meger declared that flexibility of the system is important if the operator is to be able to take advantage of less-expensive oils as they are offered on the market. However, the quality of the end product is paramount and proper treatment demands some investment in equipment to insure uniform and adequate coverage.

At Georgetown, where Pittsburgh-seam coal is treated, the system includes an underground 20,000 gal storage tank into which the bulk deliveries from tank cars or trucks are pumped. A steam connection is available for heating cars equipped with steam coils. Three immersion heaters around the feeder line maintain the flow in all types of weather. A 500-gal preheating tank is equipped with six thermostatically-controlled 1½-kw immersion heaters to raise the temperature of the oil to 150 F or higher, as necessary. Oil from the preheating tank is pumped through the system at a pressure of from 750 to 1,000 psi and the entire system is heated by resistance heating of the oil-



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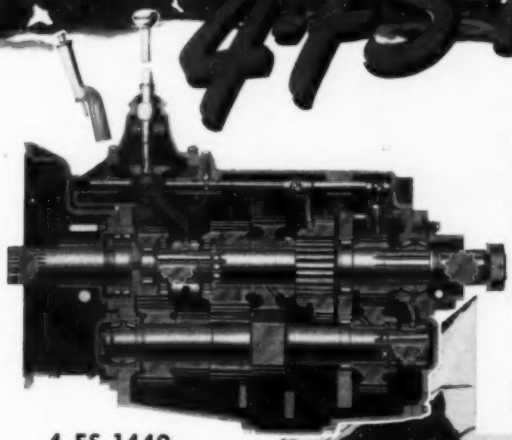

4-FS-1440

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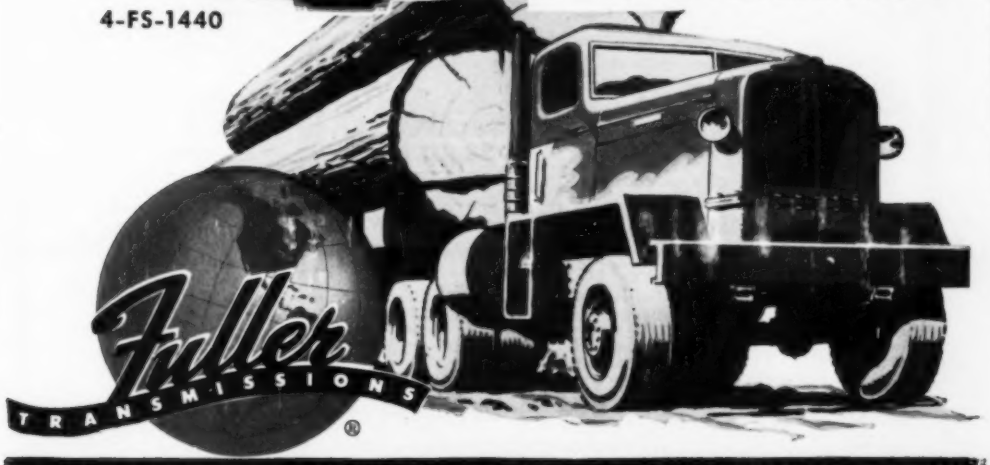
Built to deliver the power from the biggest automotive diesel engines now available plus ample capacity for high torque multiplication from the most advanced torque converters, the new 4-FS-1440 puts up to 400 hp. to work efficiently and dependably.

For maximum service plus maximum versatility in the toughest of heavy hauling, investigate the new 4-FS-1440. Write for performance and application data.

VITAL STATISTICS

Hp. handled—400. Speeds forward, 4: first, 1.98; second, 1.40; third, 1.00; fourth, .71. Reverse, 1.61. Weight 775 pounds.



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carrying pipe lines, which are insulated both thermally and electrically.

Automatic relief valves guard the system against excessive pressure if the oil is too cold. The relief valve bypasses the cold oil to the preheat tank and permits warm oil to take its place. If a leak occurs, low-pressure protection elements stop the pump and actuate signal lamps at the loading operator's control panel. Pumping equipment is installed in a pit which is protected by CO_2 extinguishers and a sump pump is available to keep the pit free of excess oil or water. The smaller sizes are treated in a hood sealed by balanced flys which keep the oil mist in the chamber through which the coal is dropped. Larger sizes which cannot be dropped because of breakage are treated under a hood over the belt or at a transfer point. As high as 450 tph have been treated, Mr. Meger said, but results are spotty at loads over 300 tph.

At the final session, topics were "Cyclone Dust Collectors for Boilers," by Prof. A. J. ter Linden, Delft University, Delft, Holland, and read by Mr. Messaros; "A Study of the Problems of Coal Freezing," by C. C. Wright and E. E. Peterson, division of fuel technology, Pennsylvania State College; and "Cost of Coal- and Ash-Handling Equipment," by C. A. Marshall, and D. M. Given, Fairmont Coal Bureau, New York. J. L. Harlow, Philadelphia Electric Co., Philadelphia, and D. J. Mosshart, Westinghouse Electric Corp., Philadelphia, were co-chairmen.

On the study of freezing problems, Mr. Peterson described efforts at Penn State to determine some of the fundamental factors involved in the freezing of coal. Pointing out that the investigations are aimed at finding out what happens at the interfaces between coal and ice particles in a frozen mass, Mr. Peterson reported that earliest studies show that breakage occurs in the ice and not at the interface between ice and coal. In measuring the strength of this bond, it was determined that oil-treated coal shows less bonding strength over the range of moisture contents used in the tests. Furthermore, coals treated with G. E. Dri-Film, a silicone derivative, exhibited still lower strength. Both oil and Dri-Film were effective in reducing the contact angle between the water and the coal surface, a necessary condition if handling of the frozen material is to be facilitated.

The nuisance in the neighborhood of a boiler plant depends upon the quantity of gases and dust particles leaving the stacks, the size of the particles, the height of the stacks and the nature of the surroundings, Prof. ter Linden said, in explaining the principles of cyclone dust-collector design. Regarding the installation of dust collectors, Prof. ter Linden presented the following conclusions:

1. For small grate-fired boilers with a maximum capacity of about 30 tph, one or two complete cyclones in parallel should be used. The exhaust should not exceed 5 ft.

2. For larger grate-fired boilers, a highly efficient multicyclone should be used. To prevent blockage in the small

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Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

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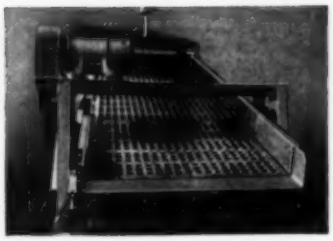

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passages, the exhaust diameter of the cyclones should not be less than 5 in.

3. For pulverized-fuel burners in an industrial or rural district, a highly efficient multicyclone or a simple multicyclone and electrostatic precipitator should be used.

4. For pulverized-fuel boilers in a residential district, a multicyclone and highly efficient electrostatic precipitator should be used.

In all cases a high stack is necessary to avoid creating a nuisance.

Unnecessary extras in one part of a system and inadequate design in another part are characteristic of a great number of coal- and ash-handling systems, Mr. Marshall said, but improved engineering standards and more careful coordination with actual handling requirements will do much to eliminate notorious inconveniences and extra labor charges which have so often resulted in the rejection of coal as a fuel. In discussing equipment for plants handling 30,000 tons per month or less, Mr. Marshall declared that over-all handling cost should not exceed $1 per ton of coal consumed. Broken down, this means 50c for fixed charges, 25c for labor, 2c for power and 23c for maintenance.

Good engineering demands that in smaller plants conveyor capacities should be intelligently designed so that work can be done on a part-time basis; that is, the aim should be to eliminate full-time laborers at any one job. Now on the market are car shakers which can be installed for $1,700 at smaller plants where a full size shaker is not justified. Furthermore, small heaters for thawing car hoppers can be purchased for $262.

In the matter of storage facilities, Mr. Marshall pointed out that concrete-stave silos may be better for smaller plants than steel bunkers because the silo can be installed for from $20 to $25 per ton of storage capacity, while the steel bunker may cost as much as $100 per ton of storage capacity. In designing hoppers, the discharge openings should be made large enough to prevent arching of high-moisture coal over the discharge opening. The point is: Design for the coal that is available to the plant, not for some hypothetical coal that may never be placed in the equipment.

NSC Reviews Safety . . .

Begins on p 136

weight of virtually unbreakable strata can no longer be supported by the pillars in an area, the collapse is a sudden occurrence which erupts perhaps hundreds of tons of coal into the mining voids. The faulted nature of the native rock also contributes to these bumps, Mr. Jackson said.

On guarding against these accidents, Mr. Jackson recommended that:

1. Mine projections should provide for uniform pillars of sufficient size to support the overburden and at the same time assume the weight and slough off, if necessary, without being pushed through the bottom rock.

2. Unusually large pillars, when left

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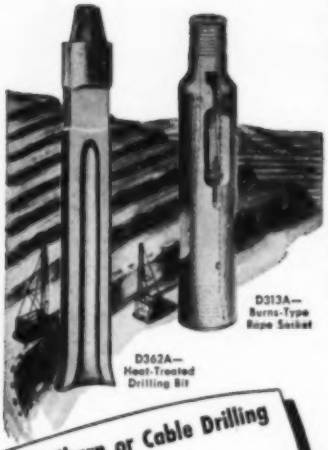

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adjacent to large caved areas, especially near the abutment zone, hold no assurance against bumps or outbursts, and they present hazards when it becomes necessary to cut them up for extraction.

3. Large blocks of coal directly in the path of a retreating pillar line should be cut up into uniform pillars far enough in advance of the retreating pillar line so that the uniform pillars may assume their share of the advancing weight. If this is not possible, secondary mining should be driven in a direction away from the pillar breakline rather than toward it.

4. Pillars should be removed in proper sequence to maintain a straight breakline.

5. Recovery of pillar coal by slabbing across the back end of the pillar toward the gob should not be attempted.

6. Splitting the pillar in the abutment zone must not be attempted, especially through the heart of the pillar. The hazards of this practice are increased under high coal.

7. Failure to mine all stumps along the breakline makes for serious, adverse mining conditions.

8. In the pocket-and-fender method, the fender should not be so wide that it will cause the pocket or room to be driven in the abutment zone.

9. In sections where bumps may occur, adequate ventilation and complete rock dusting are essential to localize the effects of such disturbances as may occur.

ROOF-BOLTING BENEFITS

In listing the problems of roof bolting Mr. Johnson declared that early shortcomings, such as the adaptation of conventional tools to the bolting process, have been solved since manufacturers have produced well-designed units for the express purpose of pinning the roof. Furthermore, the studies of the Bureau of Mines have revealed the best bolting patterns for various conditions, and the habit of making initial experiments before full-scale adoption of bolting has resulted in safer roof-control methods. In short, Mr. Johnson said, the early problems have been solved or are under investigation, to the end that bolting is here to stay. Over 500 coal mines now are bolting roof, Mr. Johnson reported.

On bolting performance, Mr. Johnson presented time-study data to show that a 2-man crew installed an average of 38 bolt per day over a 4-day period. In this period, the crew bolted five places per day with an average place-change time of 18 min. Estimated costs were 60c per ton for roof support, or $2.72 per bolt. While these costs may be higher than those for timber roof support, the difference may be made up in greater safety, higher productivity, higher recovery and a cleaner product.

Enumerating the benefits, Mr. Fies noted that bolting methods have proved to be mechanically sound, that safety is materially increased as indicated by experience at his company's Gorgas mine and that the over-all costs of production have decreased. Mr. Fies also commended the Bureau for seizing upon this

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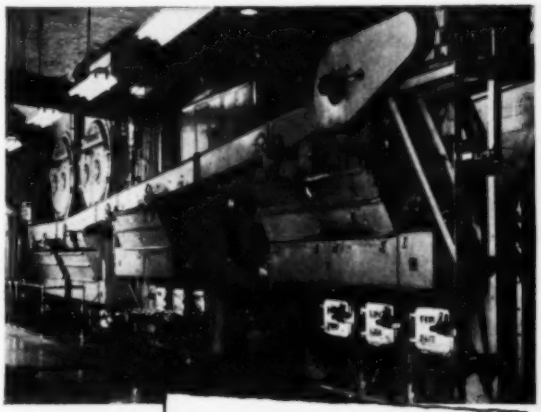
says Oliver Moses, 3rd, President, Worumbo Manufacturing Company, Lisbon Falls, Maine.



This modernized steam plant will pay for itself in 3 years!

The two new boilers shown on the right now carry the complete plant load. They replaced five boilers of the type shown on the extreme left—two of which are still in standby service. The new equipment saves Worumbo nearly 30c on every thousand pounds of steam. Automatic, dustless coal and ash handling has helped cut weekly labor costs from $606 to $242! The new plant has a 20% greater capacity—burns 150 *fewer* tons of coal each month.

Today coal can give you more steam per dollar than ever before. With modern combustion equipment, you can get anywhere from 10 to 40% more power from a ton of coal than was possible a few years ago. And with up-to-date automatic coal- and ash-handling systems you can cut labor costs to a minimum.

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Powering your plant with coal makes good sense for the future, too. Coal is the only fuel with really abundant reserves—enough to last for centuries. And this coal is supplied by the world's most efficient and productive coal industry. That's why coal is the only fuel that can offer dependable future supply and greater relative price stability.

If you operate a steam plant, you can't afford to ignore these facts!

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COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

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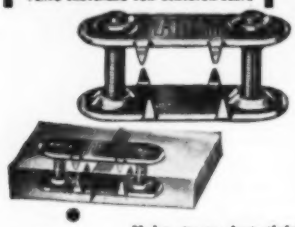

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development for increasing safety and for refining the methods for use in coal mines.

Mr. Fies cautioned, however, that exhaustive experiments should be the first order of business when a bolting program is contemplated. In addition, it may be necessary in certain instances to combine bolting with conventional timbering to achieve the desired results.

MANAGEMENT'S RESPONSIBILITY

"Until such time as an equal amount of thought is given to planning and rigidly enforcing proper methods of roof support as is now given to the production of coal, accidents from falls of roof will not be substantially reduced," Mr. Bradley declared, in making the point that while major disasters are splashed in the headlines it is the roof fall that takes not more than one or two lives that is the real No. 1 killer. Noting that responsibility for these accidents rests upon the workers, their immediate supervisors and top management, Mr. Bradley warned top management that it is not enough merely to provide standard timbering plans. It is top management's responsibility to eliminate any caste system that may exist between top and mine levels so that information concerning roof-control discipline may flow freely.

Furthermore, Mr. Bradley said, the state of mind of the injured prior to his accident may loom as a contributing factor. One approach is for top-level

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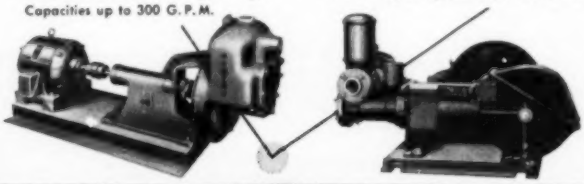

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supervisors and personnel managers to make themselves available in helping to solve personal problems of troubled employees.

Immediate supervisors of the men should be trained and proficient not only in their production duties, but also in teaching others the rudiments of accident prevention and in conducting safety meetings on their sections. Two roadblocks to better roof-fall safety are a devil-may-care attitude among the men and safety lip-service from supervisors, Mr. Bradley stated.

At the Wednesday session, J. M. Reid presiding, speakers and subjects were: **L. B. Berger,** chief, health branch, USBM, Pittsburgh, Pa., on "Progress in Development of Dry Dust Collectors"; **S. M. Cassidy,** president, Consolidation Coal Co. (Ky.), Div. Pittsburgh Consolidation Coal Co., Jenkins, Ky., on "Procedures for Effective Rock Dusting"; **E. B. Nelson,** general superintendent—coal mines, Tennessee Coal & Iron Div., United States Steel Co., Fairfield, Ala., on "Cost Factors in Effective Rock Dusting"; and **C. E. Linkous,** director of safety, Island Creek Coal Co., Holden, W. Va., on "Effective Ventilation of Gassy Mines."

DUST-COLLECTING PROGRESS

After tracing the history of dry dust collectors and noting that a U. S. patent for a simple type of collector was issued to Robert H. Elliott as long ago as 1895, Mr. Berger pointed out that Bureau of Mines test schedules require that a unit under test must repeatedly demonstrate that it can prevent exposure of the drill operator to concentrations of dust exceeding 10 million particles per cu ft.

Although the Bureau reserves the right to conduct tests under any conditions considered necessary to evaluate the equipment, Mr. Berger said, it seems likely that most tests will be conducted at the experimental mine at Bruceton, Pa., since recent tests have shown that a collector that will perform satisfactorily when drilling the soft roof above the Pittsburgh seam will be more effective when drilling hard rock because of the slower rate of drilling and the production of relatively finer cuttings.

Mr. Berger emphasized, however, that Bureau approval does not guarantee that the equipment will provide adequate dust control. The approval indicates that the equipment can provide adequate control if it is properly used and maintained.

EFFECTIVE ROCK DUSTING

Pointing out that rock dusting becomes a major problem at trackless mines working triple shifts or at low-coal mines, Mr. Cassidy presented suggestions for getting the job done, as follows:

1. This is a section mined by off-track units with shuttle cars hauling to mine cars on a track loop. In a normal 5-day week each place is dusted at least once every 24 hr with the three crews operating on a definite dusting schedule. For example, the first-shift crew dusts the section after their Wednesday and Friday shifts, the second-shift crew on

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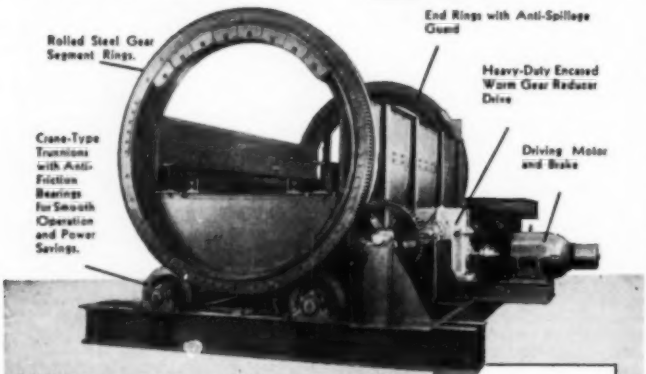

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Tuesday and Thursday, and the third-shift crew on Monday, Wednesday and Friday. This provides a 2-shift interval between dustings, except at the beginning of the week, and keeps the dusting within the minimum requirements of state law. Four men are held over to do the dusting, using 2-hp units carried in cable-reel shuttle cars with the supply of rock dust.

2. The situation is similar to the preceding example, but rockdusting is done during the lunch period by a crew of three men who can best be spared from the mining crew at the time. In this method each shift crew is assigned a definite area of dusting.

3. In low coal, the dusting machine is hauled by hand or by a battery-powered tractor. The rock dust is stored in the mine at convenient locations prior to the time they are needed.

4. In thin-coal shaker-conveyor sections, faces are dusted by hand after each cut. A 1-hp machine is used to redust the places as the permissible advance of 40 ft is approached. Entries are recoated every 2 wk by holding four men over.

On the matter of applying rock dust by the use of permissible explosives, Mr. Cassidy said, "In many cases rock dust could be very effectively and cheaply applied by inserting about one-quarter stick of permissible powder into a bag, covering it with another bag or two, then shooting. When this is done the roof, ribs and floor are plastered surprisingly well, and with but little rock dust in the air so that operations can speedily resume. Where this would be a boon is in very-thin conveyor-mined coal where rock-dusting machines can be used with difficulty, if at all, and where hand application is slow, costly and rarely too well done. Another case would be in back entries or other places inaccessible to machines or hose. This practice currently is frowned upon as being an unconfined shot despite a series of tests that were performed by the U. S. Bureau of Mines in 1948 ("Rock Dust Distribution With Permissible Explosives", Report No. 3233-C:542) at the request of this writer. These tests demonstrated that the practice was safe except under extreme conditions of gas and coal dust and misuse. In the interest of safety and effective rock dusting at the face during the operating cycle and at other difficult places, it would appear that the Bureau could well amend its present stand and approve the practice under the proper conditions."

ROCK-DUSTING COSTS

Without attempting to set up a universally-applicable figure on the costs of rock dusting, Mr. Nelson reported that at Concord mine, TCI, the following figures apply: based on current production, 9 lb of rock dust are used per ton of material mined, or 17 lb per ton of usable coal; unloading and distributing rock dust requires 0.015 man-hours per ton of material mined or 0.029 man-hours per ton of usable coal.

A total of 6,300 sacks (100 lb each) are used each week, with man-hours

consumed in various duties as follows: unloading 6,300 sacks from railroad cars and loading the sacks into mine cars, 38 man-hours; transporting 6,300 sacks from railroad cars into the mine, 18 man-hours per week; unloading 3,650 sacks inside the mine in operating sections, 43 man-hours per week; distributing 3,650 sacks in operating sections, 750 man-hours per week; distributing 2,650 sacks on haulageways and return airways by track-mounted dusting machine, 208 man-hours per week. The remaining 560 sacks are used for stemming blast holes.

Among the features at Concord which promote better rock dusting are access holes through stoppings between intake and return airways, an airline in the materials slope, which also serves as a handrail, and a waterline in the belt slope which serves as an airline when the belt is idle. Both slopes are dusted during extra week-end shifts by 4-man crews. In dusting return airways, one man proceeds through the airway counter to the flow of air. The dusting machine is in the intake heading and the dusting hose is passed through the holes in the stoppings to permit the return to be dusted. Then the man in the return joins the remainder of the crew at the face and the crew dusts the intake as they leave the section. Thus, the crew always is outby the dust-laden air currents.

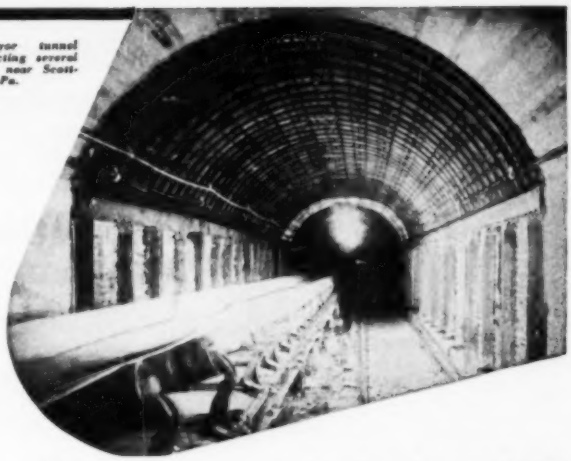
VENTILATING GASSY MINES

Listing the requirements necessary for efficient ventilation as (a) efficient fans, (b) efficient mining, (c) ample airway capacity, (d) airtight stoppings and (e) proper distribution through intelligent coursing and splitting, Mr. Linkous described the practices at a 4,600 tpd mine in the Pocahontas No. 4 seam in southern West Virginia, an area in which more methane is liberated than in any similar area in the United States.

Seam height is 72 in and cover varies from 600 to 1,800 ft. The mine openings consist of seven shafts, four intakes and three returns. Six 8-ft Aerodyne fans are installed, three operated exhausting and the other three in standby service. The fans circulate 1,712,400 cfm at a water gage of slightly less than 5 in.

Mr. Linkous described the 10-yr old system as utilizing splits, overcasts and regulators to eliminate doors along the haulageways. Main, intermediate and room-entry haulageways are ventilated by two separate splits with only four or five working places on each split. The entries consist of from 8 to 10 headings, and intake air is carried up the four center headings, one of which is the haulageway. The outer headings, along the solid ribs or barrier pillars, carry methane from the solid coal directly to the upcast shafts, thus minimizing contamination of intake air. Triple-strength flies, and doors when they are necessary at entry pickups are installed in pairs to form airlocks. Line curtains are maintained at all times to within from 6 to 8 ft of the face.

Bleeders are absolutely essential for increasing ventilation along pillar lines and for keeping gob areas free of



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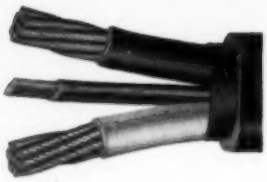

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methane, Mr. Linkous said, and for maximum integrity of the system all airways are center-posted in addition to having the standard timbering.

At the final session on Thursday afternoon, topics and speakers were: "Interrelated Safety Requirements for Ventilation, Haulage and Electrical Installations to Prevent Gas Ignitions," by **D. S. Kingery**, chief, coal-mine-haulage safety section, USBM, Washington, D. C.; "Roof Control in Longwall Mining," by **R. T. Todhunter Jr.**, general manager, Barnes & Tucker Co., Barnesboro, Pa., and "Advantages of Sealing or Not Sealing Abandoned Workings," by **Harold V. Richmond**, mine inspector, Illinois Department of Mines & Minerals, Pana, Ill. Mr. Mooney was session chairman.

PREVENTING GAS IGNITIONS

Emphasizing the fact that shortcomings in ventilation practice, such as inadequate equipment, ineffective examination, improper air coursing and lax discipline regarding the maintenance of ventilating auxiliaries will result in hazardous accumulations of methane at working faces, in roof cavities and in worked-out areas, Mr. Kingery advocated the strict application of the well-known rules of effective ventilation to prevent such accumulations. As a second step in preventing explosions, sources of ignition should be eliminated insofar as this is humanly possible.

Noting that the trend in ignition sources leans toward electrical origins, Mr. Kingery quoted figures to show that in the period from 1929 to 1948, inclusive, electrical ignition sources contributed 44% of the total. However, in 1950, electrical sources were in a ratio of 3:2 over all other sources, and in 1951 the ratio of electrical sources of ignition to all other sources was 3:1. In view of this trend, Mr. Kingery recommended that:

1. No electrical equipment, other than permissible, should be taken into or operated in other than pure intake air.
2. Installation of trolley wire and other power cables, except trailing cables and insulated cables leading to permissible junction boxes, should be in intake air.
3. All power connections for face equipment should be made in pure intake air, unless such connections are made through permissible junction boxes.
4. Auxiliary motors and electric switches not operated in pure intake air should be approved enclosed types.

LONGWALL ROOF CONTROL

In describing his company's experience with a Mavor & Coulson Samson Stripper in the "B" seam at Lancashire No. 15 mine in central Pennsylvania, Mr. Todhunter covered the reasons that necessitated a change from bord-and-pillar mining methods to longwalling in England. Among the factors forcing the change were the need for mining deeper seams, the difficulty of supporting openings under the deeper cover and demands for higher recovery. In the process, intensive study of roof action naturally followed.

In discussing various methods of supporting roof, Mr. Todhunter stated that Barnes & Tucker selected retreat longwalling with full caving in the mined out areas to eliminate the need for handling backfilling material and to relieve the weight exerted over the working face.

At Lancashire mine, a 300 x 1,500-ft panel of coal is being recovered by these retreating longwall methods, Mr. Todhunter reported. The final system of roof support required a row of chocks, 5 ft apart, along the break-off line with a Dowty hydraulic prop between each pair of chocks. Also, a row of Dowty props on 4-ft centers is installed between the face and chocks. The Samson Stripper removes a 2-ft thick slice of coal from the face and the chocks are moved up with each 4-ft advance. Laminated kiln-dried maple on steel bases provides chocks of sufficient strength to resist crushing, since the roof requires non-yielding support.

With 1,200 ft of the 1,500-ft block mined up to now, roof breakage has been good and there have been no lost-time accidents, Mr. Todhunter reported.

SEALING OR NOT SEALING

"I sincerely believe abandoned works should be sealed," Mr. Richmond declared, in pointing out that the question of ventilating such workings is hypothetical. It is the opinion of many capable and experienced mining men, Mr. Richmond said, that ventilation of these places is not only impracticable but borders on the realm of impossibility. With from 60 to 70% extraction being achieved in Illinois, squeezes disrupt brattices resulting in only partial ventilation of the old workings. Furthermore, large falls are apt to force bodies of gas from gob areas into active workings and ignitions may be caused by unauthorized personnel entering the abandoned areas. Spontaneous combustion may also occur in poorly ventilated places, and sealing shuts off the oxygen supply thus preventing this type of ignition.

On the economics of the question, Mr. Richmond pointed out that some worked-out areas are so extensive their ventilation would require such large financial outlays that some mines could not operate.

In citing instances where proper sealing has been effective, Mr. Richmond listed Zeigler No. 2 mine, Bell & Zoller Coal & Mining Co., where 4,489 acres have been mined out in the period from 1918 to 1951 without an explosion or a burn injury as a result of gas ignitions. The mine has 305 seals, sealing off 3,494 acres.

Barrier pillars along sealed areas must be of sufficient strength to prevent top and bottom pressures from riding out to seal locations, and the seals themselves must be well built and hitched into place. Taps should be provided for securing air samples from behind the seals and, if water is expected, drainage taps should be provided at the bottom of the seal. Labor and materials costs for a reinforced seal described by Mr. Richmond amount to $551.25.

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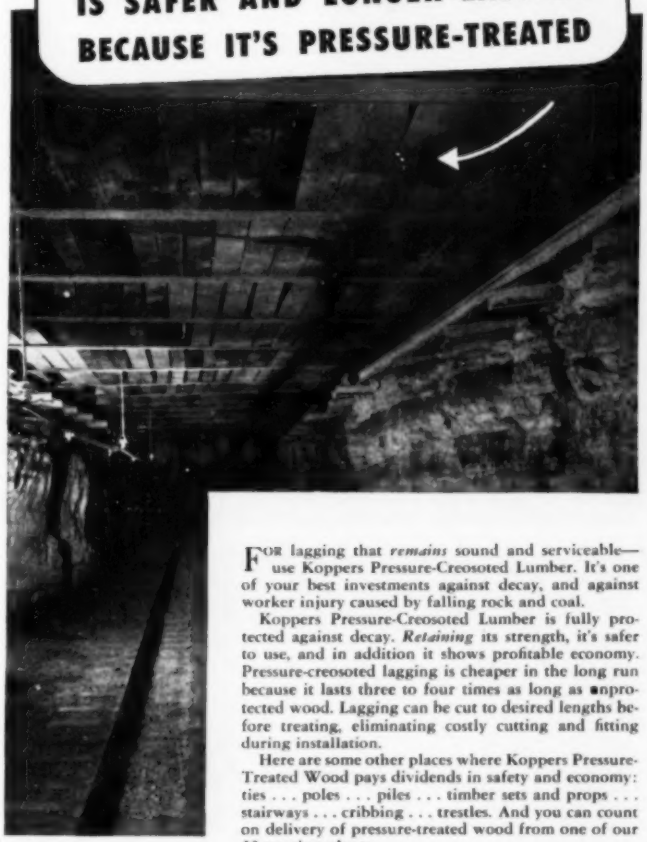

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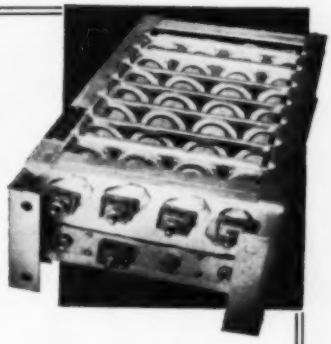

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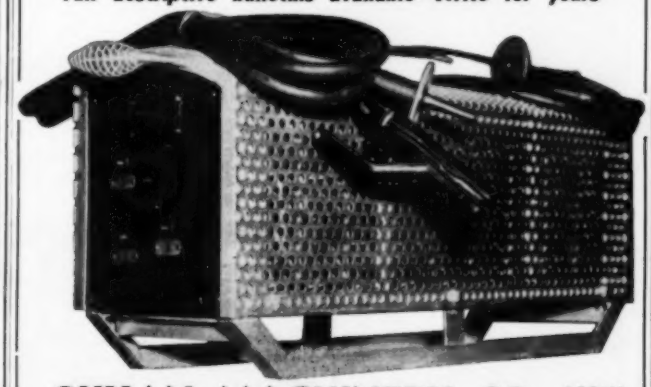

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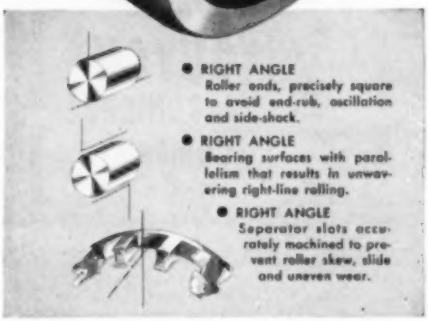
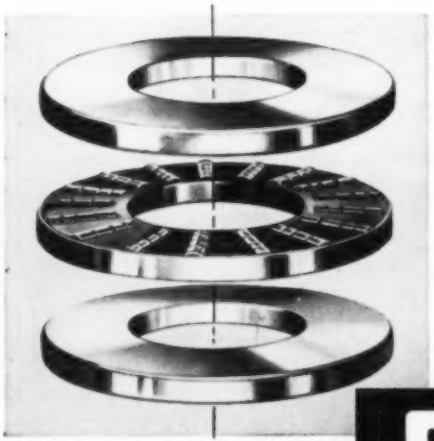
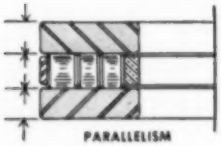


In a Rollway Radial Bearing there's no wedging of the rollers . . . no pinch out . . . far less roller end rub and wear back. Rollway's *Right Angle Design* reduces rubbing friction to a minimum — results in less service attention, longer life expectancy under heavy duty service.

In Thrust Bearing applications, accurate parallelism between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves — all adding up to quietness, equalized wear and longer life.

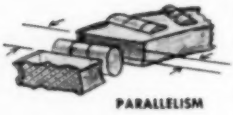




Our complete engineering and metallurgical services will gladly work with you on your problems. Simply write or wire any sales office. No cost. No obligation.

Rollway Bearing replacements are available through authorized bearing distributors in principal cities. Consult your classified 'phone directory.

ROLLWAY BEARING CO., Inc.
Syracuse 4, N. Y.



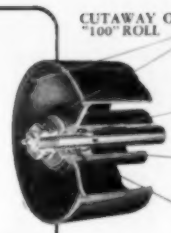
SALES OFFICES

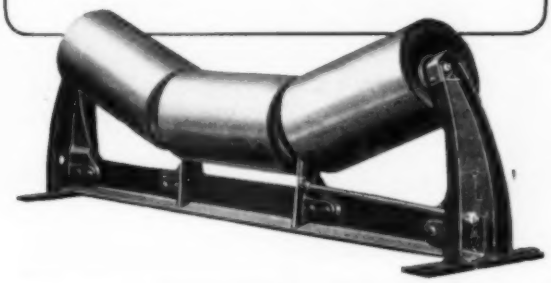
Syracuse, Cleveland, Houston, Boston, Philadelphia, Chicago, Pittsburgh, Detroit, Los Angeles, Toronto

ROLLWAY BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

Why LINK-BELT IDLERS require minimum lubrication and adjustment





By minimizing maintenance . . . holding "down-time" to a new low . . . reducing power requirements —Link-Belt Roller Bearing Idlers save you money.

And, because of standardized design, Link-Belt gives you the famous "100" Idler or the heavy-duty "200" Idler at a cost lower than you'd expect. You can choose from the full Link-Belt line of troughing, impact-cushioning, belt training and flat belt idlers in a wide range of roll diameters and belt widths. A complete line to meet any requirement.

Remember, too, Link-Belt offers a complete line of other belt conveyor components—all types and sizes of take-ups, pulleys, trippers, back-stops and drives. Coupled with our broad belt conveyor engineering experience, this assures you of the right equipment for your handling requirement.

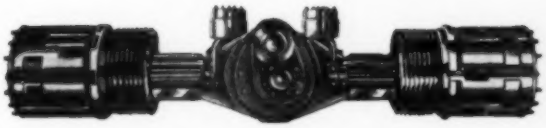
LINK-BELT

ROLLER BEARING IDLERS

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa).

12,541-A

PIONEERS IN TRUCK ENGINEERING SINCE 1910



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ANOTHER FIRST WITH DART

The first mining truck built using a triple reduction axle. This means less strain on all axle parts and permits "Dart" to use more powerful engines. Double reduction gear carrier permits wide variance of final drive ratios to meet specific requirements. Five to one planetary gear reduction in each wheel reduces gear loads. 85,000 pounds conservatively rated capacity. TALK WITH DART ABOUT YOUR TRUCK PROBLEMS. YOU'LL GET SPECIALIZED SERVICE.

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TONNAGE ENGINEERED

DART TRUCK CO. KANSAS CITY 8, MISSOURI

OVER 40 YEARS' EXPERIENCE IN BUILDING SPECIALLY ENGINEERED TRUCKS

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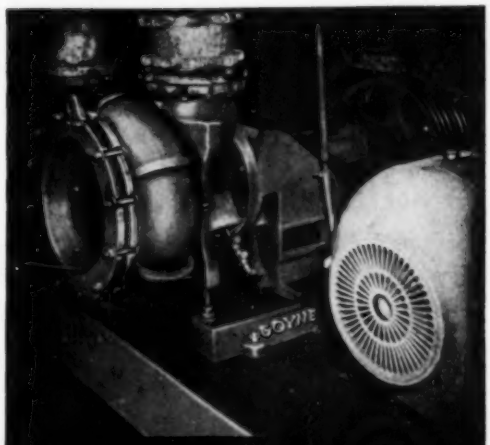

GOYNE
SOLIDS HANDLING PUMP

Feature:
LOW-COST OPERATION

GOYNE SOLIDS HANDLING PUMPS are extremely popular with a very large number of coal companies who find them quite reliable for pumping:

Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

Disposing of refuse and silt by pumping to waste material banks or for back filling into mined out areas.

Pumping prepared coal to temporarily desired storage areas.

These specially designed Goyne pumps incorporate numerous features to reduce upkeep and labor maintenance costs to a minimum:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing ***only the rear head of the pump.*** No suction or discharge piping or any other major part of the pump is disturbed.

2. The only packing box of the pump is subjected to the low suction pressure rather than to the discharge pressure developed by the pump. This feature assures long packing and shaft sleeve life.

3. Impeller clearance is adjusted while the pump is running, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goyne Process Pumps.

All inquiries are given a thorough engineering analysis and our prompt attention.

GOYNE MINE PUMPS 1881

The GOYNE STEAM PUMP CO.
ASHLAND, PA.

For rugged, 3-shift service . . . specify LINK-BELT Cast Buckets

You get extra dividends in longer life with Link-Belt Cast Buckets —

- Abrasion, corrosion and tough usage meet their match in top-grade Link-Belt malleable iron or Promal (the stronger, longer-wearing metal).
- Friction and wear are minimized by smooth, seamless surface.
- Corners are reinforced for added strength.

Equally important, accurate balance and advanced design give you the proper filling . . . clean discharge.

Link-Belt builds all sizes in six different styles . . . for either chain or belt mounting. Complete L-B line also includes steel buckets of various designs. The next time you replace your elevator buckets, call your Link-Belt representative for all the facts.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,818

LINK-BELT

CAST ELEVATOR BUCKETS

THURMAN PORTABLE TRUCK SCALE

THIS SCALE CAN BE MOVED FROM JOB TO JOB, AS A UNIT

Accurate and Portable

This scale can be transported, assembled from one job to another by removing six bolts which hold the side levers in place. The assembled scale can be loaded onto a truck and lifted as a unit. Once positioned in the new location, it can be ready for use in minutes.

- **Capacities 20, 25 & 30 Ton**
- **Platform Lengths 18, 22, 24 & 30 ft.**

Wide Steel Bases

at both ends support scale, therefore, require no concrete footing. Easy-to-read weigh-beam is chrome-plated. Other vital parts electro-plated against erosion.

Also, can be installed as a pitless scale, saving expensive concrete pit-construction costs.

The Thurman Line Includes:

• Pit Scales up to 50-Ton capacity • Pitless Scales • Batching Scales • Liquid Weighing Scales • Wheelbarrow Scales • Warehouse Scales • This and other weighing equipment in sizes to fit your requirements

THURMAN MACHINE CO.
(Scale Division)
Established 1918
N. 5th Street, Corner of Lafayette, Columbus 15, Ohio

"she might have been my kid..."

"There was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pigtails, and with the sun shining on it, she might have been *my* kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know why *I'm* giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Business Executives!
✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

Give Blood Now

CALL YOUR RED CROSS TODAY!

NATIONAL BLOOD PROGRAM

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says McCulloch Motors Corp., makers of the famous McCulloch Chain Saws. *"Three years ago we tested all makes of lubricants for the Zerol gears in the transmission of our saws. We now more than ever recommend the use of LUBRIPLATE Lubricants in our power tools."*

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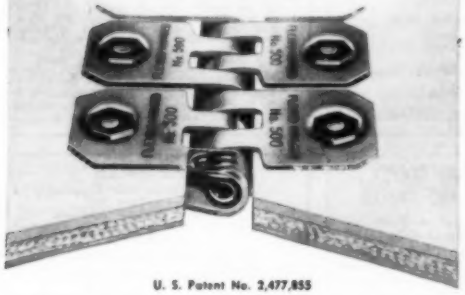

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- A FLEXCO fastener that is HINGED. Has removable hinge pin.
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- Strong, durable . . . pull or tension is distributed uniformly across joint.

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Save Trip Time on Main Haulage
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A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

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2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

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Owner—Farland Fuel Corporation

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1—8BU Joy Loader, 250 v. DC Rebuilt
2—12BU Joy Loaders, 220 v. AC, Rebuilt
4—14BU Joy Loaders, 250 v. AC, Low Pod. Good
8—42E Joy Shuttle Cars, 250 v. DC Excellent
2—6SC5E Joy Shuttle Cars, 250 v. DC Excellent
3—12-5 Joy Cat Trucks, 220 v. AC, Rebuilt
4—12-5 Joy Cat Trucks, 250 v. AC, Excellent
2—Jeffrey Aerodyne Fans, 6' with motors, A-1
1—Jeffrey Aerodyne Fan, 5' with motor, A-1
3—500 KW Rotary Converters, 275 DC, 2300 AC, A-1
1—300 KW Rotary Converter, 275 DC, 2300 AC, A-1
2—200 KW Rotary Converters, 275 DC, 2300 AC, A-1
2—MTB-30" Belt Conveyors, 1000' ctrs, 25HP drives
1—Bradford Breaker, 8' x 11', Motor, Starter, parts, etc.
2—10 T Gasoline Locomotives, Standard Gauge, A-1
Also have: Locomotives, Cutting Machines, Tipples, M-G Sets, Transformers, Hoists, Cable, Trolley Wire.

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McNally-Harton Pick Breaker
60" —— Type "A"
Coal Sizing without crushing.
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300 KW Ridgway Motor Generator Set

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1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton General Electric permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget permissible blowers

SCALES

1—100 ton Fairbanks railroad scale
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Link Belt, bucket elevator, 50' centers, 18" x 10" x 9" buckets
1—Link Belt bucket elevator, 50' centers, 10" x 6" x 6" buckets
1—Link Belt bucket elevator, 60' centers, 6" x 4" x 4" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8" centers, 36" wide
1—Jeffrey Drag Conveyor, 88'6" centers, 36" flights
1—Jeffrey Drag Conveyor, 72' centers, 30" flights
1—Jeffrey Drag Conveyor, 67' centers, 30" flights
1—Jeffrey Drag Conveyor, 69'6" centers, 28" flights
1—Link Belt Drag Conveyor, 50' centers, 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

1368'—#10 Parkway cable 3/c, 7200 volt
2977'—#8 Parkway cable 3/c, 7200 volt
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970'—#2/0 Parkway cable, 600 volt
4098'—#6 Tirex cable, 600 volt, 3/c
1417'—#4 Tirex cable, 3/c, 600 volt
547'—#2 Tirex cable, 3/c, 600 volt
1022'—#12 new Tirex cable, 4/c, 600 volt
5250#—300,000 CM stranded w.p. 1/c
14122'—#1/0 stranded r.c., 1/c
16682'—#4 stranded r.c., 1/c
2300'—#4/0 stranded r.c., 1/c
1705#—#4 solid bare
5467#—#2 solid bare
2600#—#1 solid bare
1255#—#1/0 solid bare
2975'—type TTHFA-60 new telephone cable

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125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

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Jeffrey 35-L, 29-L, 29-C, 29-B
Shortwall, Arcwall & Slabbers

COPPER TROLLEY AND FEEDER WIRE

3 Conductor 2/0, 6000 Volt Cable
4/0, 6/0, 9 section, 500,000 CM, 750,000 CM 350,000 CM and 4/0 stranded. Other sizes also.

LOADING AND CONVEYING EQUIPMENT

1 Joy low pedestal 14 BU Loader.
1 Joy medium pedestal Loader.
1 Joy 8 BU Loader, 33½" high.
1 Jeffrey 61 CLR Loader.
2 Myers Whaley No. 3 Automat Loaders.
2 Joy cable reel Shuttle Cars.
1 Joy T-2 low pan Cat Truck.
6 Joy Ladel Shaker Conveyors.
2 Joy Belt Feeders, PL-12
1 Jeffrey 61 WH, 15" Chain Conveyor, 300'
5 Jeffrey 61 AM, 12" Room Conveyors, 300'
1 Joy 30" Underground Belt Conveyor, 500'
3 Barber-Greene 24" x 50" portable Belt Conveyors
1 Quickway Truck Shovel.
1 Insley Crawler Shovel.

LOCOMOTIVES (all track gauges)

3 Jeffrey MH-7B, 10 ton Locomotives, 2 in tandem.
12 Jeffrey MH-8B, 6 ton Locomotives, 3 pr. in tandem.
(large stock of parts & supplies for above)
2 Goodman 8 ton, 28" above rail.
6 Goodman, 6 ton, armor plate Frames.
3 Goodman, 4 ton, 24" above rail.
3 Westinghouse 904, 6 ton, bar steel frame.
(Most of the above have motor driven reels)
1 Gas 4 ton—2 Diesels 16 & 20 ton.

MINE CARS

80 End Dump, 48" Ga., 30" above rail.
30 End Dump, 48" Ga., 20" above rail, all steel.
25 Drop Bottom, 44" Ga., 24" above rail.
20 End Dump, 42" Ga., 30" above rail.

MISCELLANEOUS

6—8,000 Gal. Tank Car Tanks.
5000 Five Gallon G.I. gas and water cans.
Relaying Rails, 400 tons, 20, 30, 40, 70#
Steel Mine Ties, 42", 44" and 48" Ga., 20# 30#, 40# and 60#.
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Vibrators, all sizes.
Loading Booms, Belt, and Chain & Flight.
Coal Drills, CP-572, AC and DC
Jeffrey A-6 Post Drills.
New alemite portable Greasing Unit.
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Stationary Motors AC & DC. All sizes.
Spare Armature of all kinds.
Mine Scales, Pipe Threading Machines.
New Westinghouse Tandem Hydraulic Control Assembly for 6 to 10 ton Locomotives.

POWER PLANTS

1 GMC Diesel, 75 KW, 275 Volts.
2 Superior Diesels, 100 KW, 275 V.
1 Motor Generator, 150 KW, 275 V.
4 Rotary Converters, 150, 200 & 300 KW, 275 V. 2300 & 6900 primary volts.

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INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — FIRE, WATER, SUCTION, AIR, STEAM AND WELL HOSE

WHY WAIT

We have 8 to 48

RUBBER CONVEYOR BELTING

TOUGH COVERS—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED. ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK.

All our belting made by the leading belting manufacturers.

Write for Free Booklet on Installation, Care & Maintenance of Conveyor Belting.

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C. S. Card Iron Works, roller bearing, 36" gauge, 88 cu. ft. capacity, 49" ht. above rails, 55" width, 122" length. Rocker dump type. Buyer taking all cars gets Rotary Dump included at no extra charge.

ALSO

5—G20-B77 Goodman Shakers, U.S.B.M. 220/440 - 3 - 60 motors.

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Immediate delivery 1 P&H Model 1400

ELECTRIC STRIPPING SHOVEL

guaranteed excellent condition, 48 ft. boom, 34 ft. sticks, 3¾ yd. bucket, large inventory of parts.

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3100 lin. ft. 36", 4 ply, 42 oz. Belting.
317 8-ft. Intermediate Sections complete.
1 Drive Unit and 1 Tail Section, together with all electrical controls.
New and Unused—Immediately Available at reduced prices.

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NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Tons 13" to 56" Track Gauge.
GREENSBURG MACHINE CO.
Greensburg, Pa.

Ironton
Electric Locomotives
New and used.
The Ironton Engine Company
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FOR SALE

WIRE ROPE

2—1,250 Ft. Pcs. 1-⅝" Roebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

SPECIAL SALE!

Guaranteed Equipment—Immediate Shipment

Write—phone—wire in advance. Almost everything in stock and ready to go.

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Heavy duty eccentric-shaft types: 1 to 5 decks, 3'x8' to 5'x14'. Others from 2'x4'. Wire cloth or plate included to your specifications.

priced from $431.00

CINDER, PUMICE, PERLITE CRUSHERS

10 to 20 tons per hour capacity	$ 479.00
25 to 50 tons per hour capacity	1144.00
50 to 100 tons per hour capacity	1483.00

Complete with hoppers.

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Complete with motor and drive. 15 to 225 tons per hour capacity. Priced from .. . $423.00

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20 Ton Truck Scales	$525.00
26 Ton Truck Scales	582.00
33 Ton Truck Scales	895.00

Others to 50 ton capacity. All scales complete with structural steel. Parts and weighing beams for most makes of motor truck scales.

BUILD YOUR OWN CONVEYORS AND BELT FEEDERS

3-roll Troughing Idlers for these sizes:

14" belt	$16.50	24" belt	$18.75
16" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
42" belt	$21.00		

1-roll Return Idlers for these sizes:

14" belt	$6.38	30" belt	$8.25
16" belt	6.75	36" belt	8.75
24" belt	7.50	42" belt	9.50
48" belt	$10.25		

HEAD AND TAKEUP PULLEYS

All welded steel. With or without frames. All sizes. Head pulleys in frame from $154.00. Takeup pulleys in frame from $189.00.

CONVEYOR BELTING

Famous brands at deep cut prices. 30 Day Sale. Subject to stock on hand.

Heavy duty, abrasive resistant rubber covers vulcanized to the impregnated cotton duck carcass for utmost performance and to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation. Troughs easily, sauce resistant, for long, short and slope installations.

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass	Price
16"	4	1/8"	1/32"	28 oz.	2.26/ft.
18"	4	1/8"	1/32"	28 oz.	2.50/ft.
24"	4	1/8"	1/32"	28 oz.	3.23/ft.
30"	4	1/8"	1/32"	28 oz.	3.97/ft.
36"	4	1/8"	1/32"	28 oz.	4.70/ft.
48"	4	1/8"	1/32"	28 oz.	6.16/ft.

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1—500 KW G.E. Syn. 275 V. 900 RPM
1—400 KW G.E. Syn. 575 V. 720 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1— 200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM

ROTARY CONVERTERS

2—500 KW G.E. Syn. 275 V. 1200 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM

NEW G. E. RECTIFIER

1—200 KW G.E. Sealed Ignitron Rectifier Mining Stationary Type, 2300/4000 V. AC, 275 V. DC. Complete with AC Switchgear Cubicle and DC Switchgear Cubicle. Equipment is throat connected to the main 235 KVA Rectifier Transformer. Rectifier Model #6RP40CAA30. Complete with water and heat exchangers. Power Transformer and all other necessary accessories. Unit has never been in service.

PORTABLE COMPRESSOR

1—Ingersoll-Rand Model 25-B, Two Stage Air Cooled, Size 6 x 5 x 5" Stroke, 100# Pressure. Driven by 30 HP Westinghouse 230 V. DC Motor with Automatic Starter. Mounted on 36" Gauge Trucks.

LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-824-A 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77 4836" Ga.
1—20 T G.E. 250 V. (Tandem) HM-809 36" Ga.
1—13 T JEFFREY 250 V. MH-110 44-36" Ga.
1—13 T JEFFREY 500 V. MH-110 44-36" Ga.
1—10 T JEFFREY 250 V. MH-2110 48-36" Ga.
2—10 T JEFFREY 250 V. MH-110 42-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 36-B 36" Ga.
2— 8 T WEST. 250 V. ML-906-C 44-36" Ga.
1— 8 T WEST. 250 V. ML-925-LK 24" Ga.
2— 6 T JEFFREY 250 V. MH-88 44-36" Ga.
1— 6 T JEFFREY 500 V. MH-88 44-36" Ga.
2— 4 T GOODMAN 250 V. MS-4-E 36-24" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
2—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-904-C, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
4—WEST. 80 V. V-49-X, Ball Bearing

LOCOMOTIVE ARMATURES

MH-78-500 V.	908-C-500 V.	HM-824-A-250 V.
MH-88-250 V.	906-C-250 V.	HM-824-A-500 V.
36-B-250 V.	158-C-250 V.	HM-809-250 V.

DISTRIBUTION TRANSFORMERS

3—100 KVA Westinghouse, 13,200/2300
3—75 KVA Kuhlman, 13,860/13,580/13,200/12,870/12,540—120/240

AUTOMATIC BREAKER

1—600 Amp. ITE Modern Automatic Reclosing Circuit Breaker, Type KSC, 275 V., Class 2, Enclosed in Portable Steel Cubicle.

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"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

MOTOR GENERATOR SETS

400 KW West., 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West., 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v., 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900 vR-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D-A 220/440 v.

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 38/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 28½" ga.
4—5 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
12 G3 Goodman Shortwall 230/3/60
35 BB Jeff. A.C. permissible
3—12A Goodman Shortwall 50MP Motor 250 v.

ROTARY CONVERTERS

2—500 KW G.E. 250 v. HCC6-1200R, 13,200 v.
400 KW West 250/125 v. 1200R, 13,860/2200/4000
300 KW G.E. 275 v. HCC6-1200R, 2300/4000 v.
300 KW G.E. 275 V. HC12-600 R, 2200/4000
200 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
Will rewind transformers to your specifications.

AC MOTORS

HP	MAKE	SPEED	TYPE	WDG.
400	G.E.	450	IM	S.R.
300	G.E.	450	WT	S.R.
150	G.E.	600	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	WT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CS	S.C.
15	West.	1750	CS	S.C.

Many smaller units in stock.

Also 230 V. DC Motors Rated 200-125-75-60-30-10 HP.

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MOTOR GENERATORS
2—300 KW West. Syn. 275 V. 1200 RPM
3—300 KW G.E. Syn. 275 V. 1200 RPM
These are 3 phase, 60 cycle, 2300/4000 volt, complete with switchboards and full automatic AC and DC switchgear.

ROTARY CONVERTERS
2—300 KW G.E. Syn. 275 V. 1200 RPM
1—250 KW West. Syn. 275 V. 1200 RPM
2—200 KW G.E. Syn. 275 V. 1200 RPM
1—100 KW G.E. Syn. 275 V. 1200 RPM
These are complete with switchboards, switchgear, and single phase transformers for 2300 volt.
1—250 KW West. Mine Type Rectifier

LOCOMOTIVES, 250 V DC, BALLBEARING
2—20-ton Jeffrey, MH-77
2—15-ton West. 808-C4
2—15-ton West. 908-C
2—15-ton Goodman 36-A
5—15-ton Jeffrey MH-110
2—15-ton G.E. HM-829
4—13-ton G.E. HM-827
2—13-ton Jeffrey MH-110
4—10-ton Goodman 34-B
3—8-ton G.E. HM-810 with reels
4—8-ton G.E. HM-834 with reels
2—4-ton Jeffrey MH-88
Complete with new Jeffrey steel strip resistances. All have been rebuilt and any part showing any wear was replaced with new. Guaranteed 100 per cent against electrical and mechanical defects.

STEEL TIPPLES AND WASHERS
1—5-Track Steel Tipple with Link-Belt No. 9935 Washer, 250-300 tons per hour capacity, complete with 4 large loading booms, shaker screens, vibrating screen, and all necessary appurtenances. Like new.
1—3-Track Jeffrey Steel Tipple with 4 large loading booms, shaker screens, rescreening plant, equipped with Nordberg mesh screens, capacity 200 tons per hour; 8' shaker screens, coal cleaner, Jeffrey 36 x 30 coal crusher, motors, and all necessary appurtenances.
Several other 3- and 4-track steel tipples suitable for strip, drift, slope or shaft mines.

LOADING MACHINES, 250 V DC
6—14-BU-3PE Joy
4—14-BU-7RBE Joy
6—11-BU Joy
6—8-BU Joy
10—7-BU Joy
3—460 Goodman
3—360 Goodman
4—260 Goodman
3—L-600 Jeffrey
3—L-500 Jeffrey
2—Myers-Whaley No. 3 Automats, practically new.

AC CUTTING MACHINES — 220/440 V
2—Jeffrey 29-U
1—Jeffrey 24-B
3—Jeffrey 35-BB
1—Jeffrey 35-L
5—Goodman 12G3
5—Goodman 112G3
4—Goodman 112G3A
2—Goodman 112DG3A

PERMISSIBLE TYPE, 250 V DC
6—Jeffrey 29-U on rubber tires
3—Jeffrey 29-U cat mounted
4—Jeffrey 29-U track mounted
5—Jeffrey 29-UC
10—Jeffrey 35-BB
4—Jeffrey 35-BC
8—Sullivan 7-B on cats
6—Goodman 512 on cats

ELECTRIC HOISTS
All types of Hoists from 100 HP to 1200 HP suitable for slope, shaft or drift mines.

STEEL MINE CARS
Several lots of Rotary Dump, End Dump, and Drop Bottom Mine Cars for high and low vein mines. Mail us your inquiries. We have them in lots from 100 to 000; track gauges 36" - 40" - 42" - 44".

ALL TYPES OF CABLE REEL SHUTTLE CARS, 250 V DC

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

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GUARANTEED A-1 RECONDITIONED COAL MINING EQUIPMENT

Goodman 360 Loaders
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Sullivan 7AU Cutting Machines
CPT574 Post Mounted Drills

New spare parts for all of the above equipment at substantial savings.

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SUNNYSIDE, UTAH

POWER UNIT

Caterpillar D17000 Diesel Engine connected to Lewis-Allis 125 KVA 3 phase 60 cycle 220-440 volt A.C. Generator. This machine was in use 3,109 hours. Excellent condition.

DUGGER TIRE & ELECTRIC SERVICE
W. M. Hunley — Dugger, Indiana

LOCOMOTIVES
2—13 ton Jeffrey MH-110, 250 D.C. 42" Ga.
1—[illegible] ton Jeffrey MH-110, 250 DC, 42" Ga.
3—8 ton Jeffrey MH-100 250 DC 42" ga.
6—4 ton Jeffrey MH-88
4—6 ton Mancha Battery Type 48 cell, C-61-6 mtrs 42" ga.
8—13 ton G.E. 42" ga.
20—8 ton Goodman, 42" ga.
1—8 ton Goodman, 42" ga.
1—15 ton Westinghouse, 42" ga.
8—5 ton GE Battery, 36" ga. (with batteries)
1—5 ton Mancha Battery, 36" (with batteries)
3—12 ton Jeffrey, 42" ga.
2—12 ton GE, 42"
6—6 ton GE Battery, 42"
2—12 ton Goodman, 42" ga.

LOADING MACHINES
25—Joy Loaders, 250 DC, 42" ga. 7 & 5 BU
2—Joy Continuous Miners, 250 DC

CUTTING MACHINES
10—Goodman Shortwall Cutting Machines

COAL DRILLS
17—Chgo-Pneu. post mt'd coal drills, AC & DC
50—Type 473 Dooley Bros. Elec. Coal Drills

MINE & SHUTTLE CARS
150—4 ton steel mine cars, 42" ga. 'E dump
25—Jay shuttle cars, 42D
200—3 ton 42" ga. ACF Mine cars, Timken
200—2½ ton ditto
10—Charging panels for shuttle car batteries

GENERATORS
1—2000 KVA Westinghouse 2400 V generator, comp.
1—1500 KW Allis Chalmers 2400 V Generator, comp.
1—700 KVA GE
2—150 KW Westinghouse MG set 2300 V.
1—300 KW GE
1—75 Westinghouse MG set

CONVEYORS
1—36" BA Conveyor with 150 HP drive, 2000'
6—Joy Elev. conveyors, type PL-11-2E

CAR SHAKEOUT & HOISTS
1—6 ton heavy duty L.B. car shakeout with 8 ton elec. hoist for 220/440
1—Hewitt-Robbins heavy duty Shakeout A.C.

TIPPLE
1—8 track tipple comp. with shaker & boom

MINE AND SLOPE HOISTS
3—12000# Wellman Sgl Drum 4'x5' F hoists with 150 HP motors, starters, safety control, 250 V DC
1—10000# Clyde DC
1—20,000# Nordberg Sgl Drum
1—11,000# Wellman Sgl Drum AC
1— 7,000# Ottumwa Sgl Drum AC

CARPULLERS AND LOADERS
1—10,000# Link Belt Capstan Carspotter new
1— 5,000# Jeffrey Carspotter AC
1— 5,000# Link Belt Carspotter AC
1—20,000# Amer. Hoist Carspotter AC
1—20,000 LB Endless puller

CRUSHERS AND MISC.
1—30x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
1—18x20 Eagle Dbl Roll
1—420' x 36" BA Comb. Scraper & Bucket Conveyor w/o Mtr. Ideal for tipple or dock.
2—24"x60' BA Portls. conveyors AC motor
1—(New) Nolan Portls-Feeder
4—Joy Caterpillar T-IE Mining Machine Trucks

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Telephone Harrison 7-0725

REAL BARGAINS

2—8BU Joy Loaders, 250 Volts. Rebuilt.
1—12BU Joy Loader, 250 Volts. Good Condition.
1—150 KW West. Rotary Converter, 2300-275 V.
1—100 KW G.E. Syn. M. G. Set, 2300-275 V. Rebuilt.
4—32D Joy Battery Shuttle Cars, with charger.
2—35B or BB Jeffrey Shortwalls, 250 Volt—With or without truck. Rebuilt.
2—7AU Sullivan Universal Track Mounted, 250 V.
1—29U Jeffrey Universal Track Mounted, 250 V.
2—6 ton Jeffrey MH88 Locomotives, any gage.

TIPPINS MACHINERY CO.
1001 Washington Blvd. — Pittsburgh 6, Pa.

RAILS-TIES
TRACK ACCESSORIES

IMMEDIATE SHIPMENT
RAILS NEW RELAYING
SWITCH MATERIAL
ALL TRACK ACCESSORIES
MIDWEST STEEL CORPORATION
516 Dryden St.
Charleston 21, W. Va.

ROTARY CONVERTERS In Stock

For Sale by Specialists of nearly 40 years experience. Just tell us your problem and we will quote a unit rebuilt and tailor-made for your job. Also offer other substation equipment. Consult us; no obligation.
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5024 Montgomery Road, Cincinnati 12, Ohio

NEW RAILS RELAYING

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches, ties and cars.

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"CERTIFIED REBUILT"

M-G SETS—AC to DC
500 KW G.E. syn. converter, DC 275 v.
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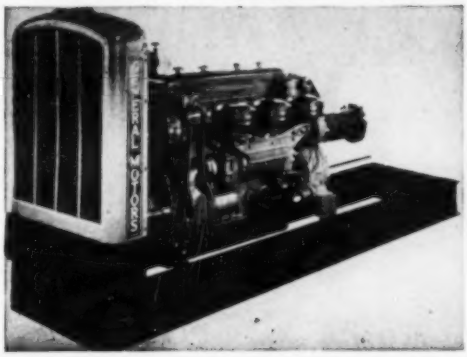

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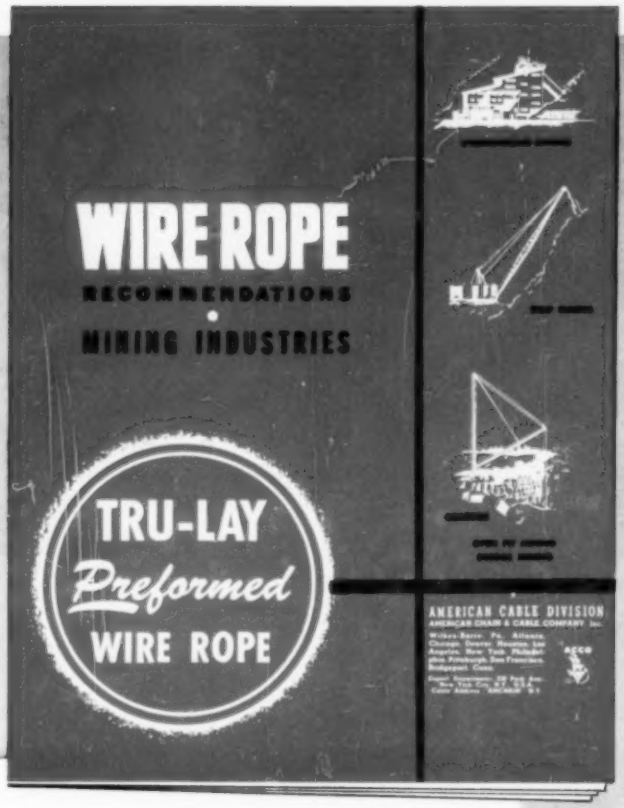

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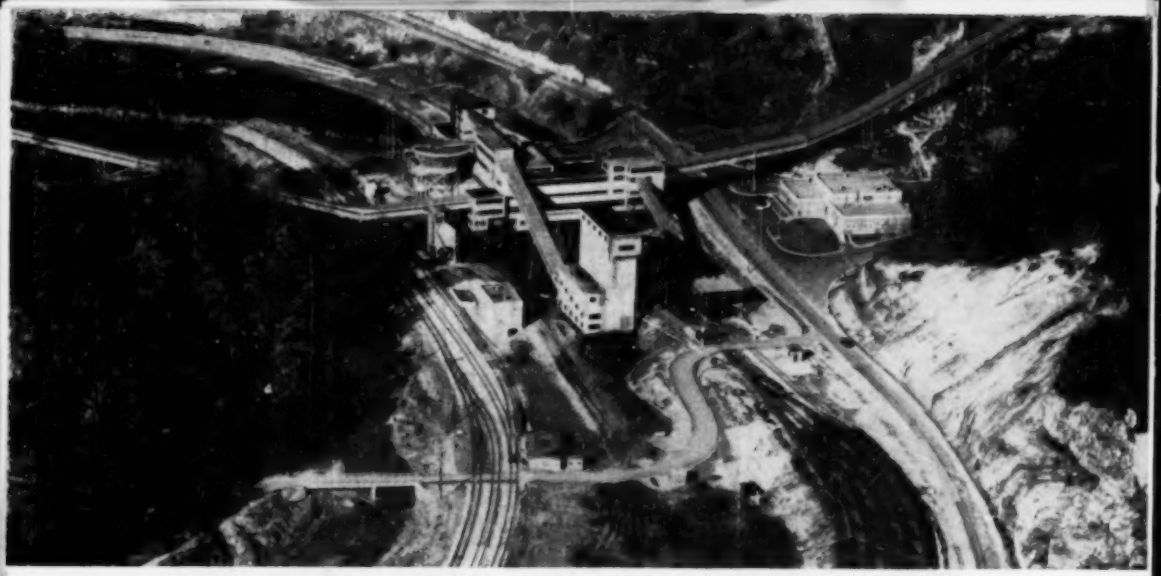

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